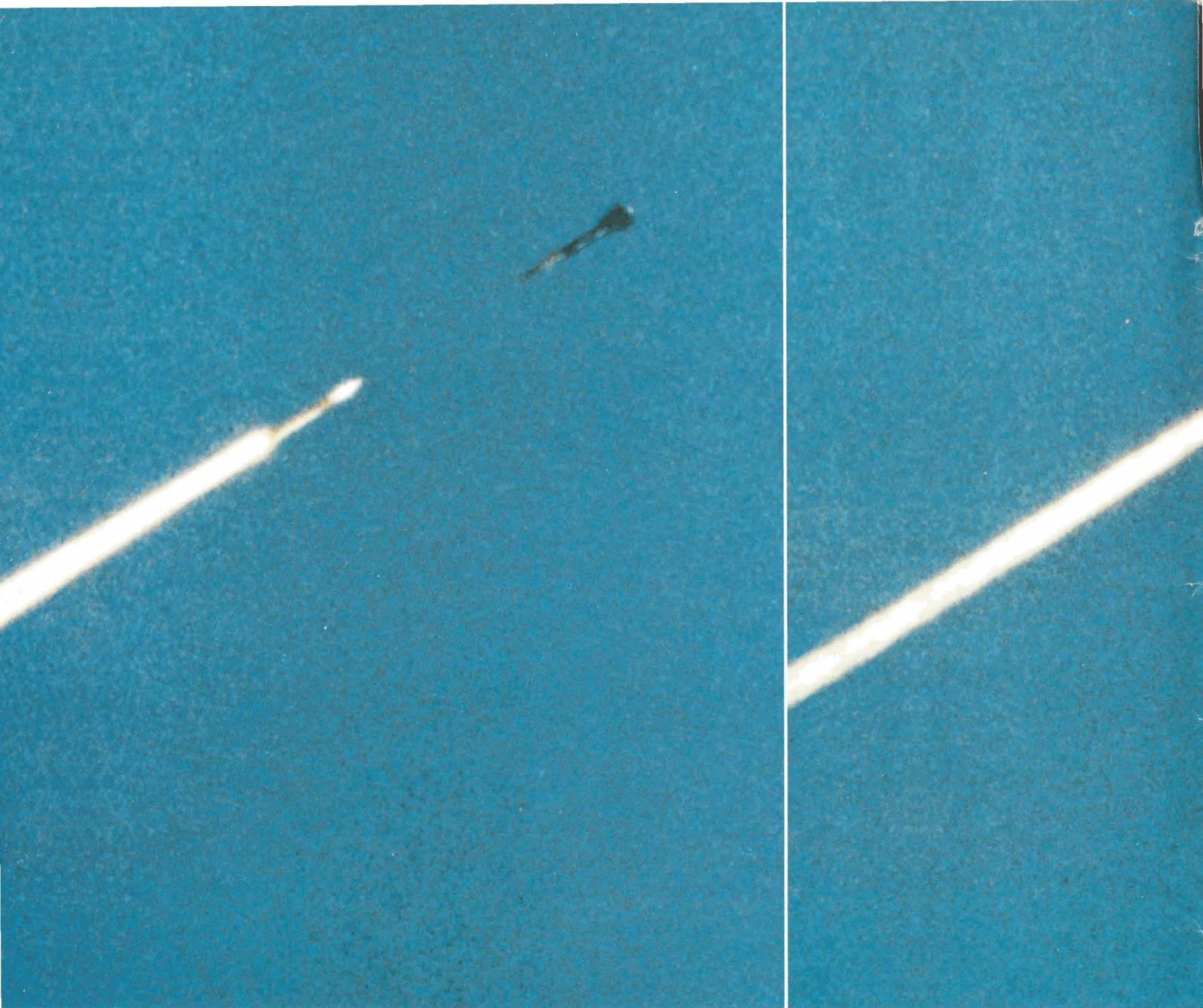




AIR DEFENSE ARTILLERY — MARCH-APRIL 1991





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AIR DEFENSE ARTILLERY — MARCH-APRIL 1991

FEATURES

Scud Attack!	6
Desert Storm Air Battle	8
Team Patriot	12
State of Bliss	16
Into the Storm	19
Homecoming!	22
Patriot Mania!	26
Avenger Air Wolves	31
CATS	33
NLOS Contest on Hold	40
Gulf War Weaponry Spawned in WWII	41
The Yom Klippur War	44

DEPARTMENTS

Dear ADA	1
Intercept Point	2
ADA Forum	10
Vapor Trails	20
Career News	37
ADA Library	47

CORRECTION

Photographs in 1st Lt. Mary Hillman-Peterson's article titled "Chemical Attack!," published in the November-December 1990 issue of ADA, showed soldiers wearing MOPP-4 gear incorrectly. The photos were selected by editors, not by the author.

Maj. Gen. Donald M. Lionetti
Commandant, USAADASCH

Blair Case
Chief, ADA Publications Division

Lisa Henry
Editor-in-Chief

Hubert Koker
Editor

Kathleen Cover
Assistant Editor

John Paul Jones
Marc Sallnas
Contributing Illustrators

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Image/Southwest

Terry J. Lewis
Publisher

John M. Case
Production Manager

Mellie Harding
Graphics Design

Carol Dycus
Data Processing

Glynn Leach
Advertising Representative



DEAR ADA

Letters From the Gulf

Capt. Roger F. Higgins, Headquarters Battery commander, 3rd Battalion (Airborne), 4th Air Defense Artillery, was one of the first air defenders to arrive in Saudi Arabia. In the following letter, written after his return to Fort Bragg as the battalion's rear detachment commander, he describes conditions at the 82nd Airborne Division's Champion Base during the early days of Operation Desert Shield.

The heat was very oppressive at midday, but quite tolerable in the mornings and evenings. The most irritating of all the discomforts were the hordes of flies that always seemed to be present. They didn't bite, but they were always on you, and swatting them away was futile.

At Champion Base, where a large chunk of the division was staying, we occupied a recently completed military installation. The facilities were very modern and air-conditioned, but severely overcrowded. The engineers supporting the division did an outstanding job in constructing showers and latrines to accommodate the extra people.

Except for training exercises, soldiers of the 3-4 ADA and the rest of the 82nd Airborne Division are pretty much restricted to Champion Base. PT is conducted daily and sometimes twice a day. The battalion commander, Lt. Col. Donald Kirk, conducts a six-to seven-mile battalion run every payday. Our battalion, on the average, probably runs more than any other unit in the division.

Soldiers look forward to training in the desert not only as an opportunity to get out of Champion Base for a few days or a week, but to hone their desert fighting skills and familiarize themselves with the terrain and conditions that are so foreign to Fort Bragg. Training is intense — as it should be considering the threat that lies to the north.

In light of the conditions, morale is still high, but boredom must be continuously fought. Popular spare time activities include team sports, reading and writing loved ones and friends. The mail clerk has become the most important man in the unit and a letter from home does wonders to bring up morale.

Still, the soldiers are getting impatient. Many would like the crisis to end, one way or the other. The waiting probably gets on people's nerves more than anything else.

SFC Ray Richardson, an Army reservist who worked as ADA magazine's art director before accepting employment at Fort Benjamin Harrison, Ind., described Scud attacks from a combat support soldier's point of view.

Sunday night, we were the target of a Scud attack. Three or four Army air defense Patriot missiles were fired from near my camp at Iraqi Scud missiles. I did not realize at first that the Patriot missiles were outgoing rather than incoming and, thanks to my Fort Bliss training, I had my MOPP (protective suit and mask) on in seconds. Slept half the night in my MOPP suit with the mask off.

A Scud missile was fired at our work location this morning. I saw our Patriot missile go after it. Our Patriot missile is 17.5 feet long, compared with the Scud which is 37 feet long and 33 inches in diameter. Some of its one-ton payload can be chemical agents.

Today is the fifth day of the war. I'm as fine as can be. The 12-hour work days go by fast. I'm active all day and tired at night. Lots of food from home. Lots of candy and sodas. Some near-beer. We are served a lot of chicken, hamburger and hot dogs. One mess hall tried to make pizza.

(Continued on page 29)



INTERCEPT POINT

Air Defense Artillery soldiers are homeward bound from the War in the Gulf — a war that ended with breathtaking suddenness in the rout of the Iraqi army, the liberation of Kuwait and the destruction of Saddam Hussein's ability to wage wars of aggression. The magnitude of the coalition victory and Arabic sensitivity to the presence of foreign troops should ensure the speedy return of ADA units to their home stations in Germany and the United States. Some have already returned, and the rest should be home, or on their way, before the end of spring.

They will come home to help untie the profusion of yellow ribbons, be with their loved ones once again, march in victory parades and celebrate their historic role in a "Desert Cannae" that will rank high among history's list of decisive battles.

The Desert Storm ground campaign was barely 100 hours old when President George Bush, satisfied that all our military objectives had been achieved, announced a cease-fire on Feb. 27. It was the most dramatic (and efficient) military victory in the history of our nation. Casualties were miraculously light throughout the combined arms team, a statistic that reflects the brilliance of our operational plans; the excellence of our weaponry; the professionalism, skill and training levels of our soldiers; and the care exercised by our combat leaders from the highest to the lowest echelon.

The casualty reports do not reflect the heroism displayed by ADA soldiers, their dedication to duty, the "First to Fire" branch's contribution to Operation Desert Storm or the magnitude of the challenge that awaited them in the desert sand. Along with about 443,000 coalition troops, 200,000 of them U.S. sol-

diers, sailors, airmen and Marines, they faced a seasoned Iraqi army of 623,000 men equipped with modern tanks, artillery, aircraft and tactical ballistic missiles.

The activities of divisional ADA units and ADA task forces organized to support maneuver forces during the coalition's grand encirclement of Iraqi forces in Kuwait and southern Iraq are still cloaked in operational secrecy. Some reached the banks of the Euphrates and took part in the destruction of the Iraqi Republican Guard.

One Vulcan gunner atop his track parked amid the smoking ruins of Republican Guard tanks told an ABC newsmen on the morning of the cease-fire that he wasn't ready to quit, not while Saddam was still in power in Baghdad.

A final and full assessment of air defense artillery in the forward area of the battlefield will have to await the filing of after-action reports and the lifting of the veils of security precautions, but I will see to it that their story is told.

However, one story can be told now: the story of U.S. Patriot vs. Iraqi Scud, for the Desert Storm spotlight shone brightly and often on our Patriot crews as they battled Iraqi tactical ballistic missiles over Saudi Arabia and Israel. It was a blazing duel fought out on "prime time" television. Their contributions guarantee an enormous role for Air Defense Artillery in any future contingency theater effort this nation undertakes.

Patriot and Air Defense Artillery played a tremendously important geopolitical role in the Persian Gulf — a role likely, in this era of contingency warfare, to be re-enacted in the future. The Scud-B may be the "dinosaur" of tactical ballistic missiles, but when



Members of the U.S. Army 11th Air Defense Artillery Brigade held up T-shirts signifying them as "Scudbusters" as they stood by the remnants of a Scud in Saudi Arabia. The Fort Bliss, Texas, soldiers were individually decorated for their work. (AP/Wideworld photo)



INTERCEPT POINT

aimed at civilian populations, it proved to be an extremely dangerous dinosaur.

The arrival of U.S. Patriot batteries while Scuds rained on Israel is the single reason a nation, bred on a doctrine of retaliation, refrained from launching an attack that could have shaken the Gulf War coalition asunder. The fiery midair intercepts of Scud missiles before they impacted in Riyadh, Saudi Arabia's capital city, heartened and strengthened the resolve of our host population. Our Patriot forces made a critical theater-strategic contribution that changed the face of war.

While the media often attributes their triumph to superior technology, those who have followed the progress of our Patriot battalions from collective training through center certification or European tactical evaluation recognize it as an achievement built on will and perseverance — a testament to the character and quality of ADA soldiers. The "microchip miracle" that is Patriot runs on muscle and sweat and owes its effectiveness to the skill of highly trained soldiers and their devotion to duty.

It's cool inside the air-conditioned Patriot engagement control station where tactical control officers watch the radarscopes and push the buttons that send Patriot missiles on their way, but outside it's not a push button war. Sand keeps mechanics, who maintain the battery's fleet of prime movers, busy around the clock. During drills, the "hot crew" moves through the sweltering heat from launcher to launcher, firing up diesel engines, powering up electronics, and turning the torque tube handles on each canister to release the missiles for firing. Stinger teams, their equipment already loaded aboard trucks, fan out to form a defensive perimeter against aircraft that might sneak underneath the Patriot radar. The 50-page daily diagnostic printout shows the missile system repairmen all systems are "a go," but the maintenance crew stands ready to perform their battle damage assessment and repair drill in case something goes wrong. At night, every ADA soldier reverts to infantryman. Through the talcum powder sand, a sergeant trudges from the launcher to the engagement control station to the information coordination central to the

berm line. Everything is ready — has been ready practically forever — but still he checks. The new face of war has some familiar wrinkles.

At the onset of the ground campaign, U.S. Patriot batteries stationed in Saudi Arabia and Israel were credited with intercepting 64 of the 65 Scuds that had entered their engagement envelopes. U.S. Patriot battalions had trumped Saddam Hussein's "Israeli Card" and reduced the effectiveness of his tactical ballistic terror campaign to virtually zero.

What's been overlooked amid the general euphoria is Patriot's significant contribution to the achievement of Desert Storm's operational and tactical missions.

"If you are unlucky enough to get hit by a Scud, you were going to have a bad day anyway," a briefing officer eager to discount the Scud as an inaccurate and militarily ineffective weapon told reporters. While the Scuds aimed at Riyadh and Tel Aviv were dismissed as terror attacks of little military significance, those targeted at Dhahran and other coalition staging areas were not addressed "to whom it may concern." They were aimed not only at our capability to execute and sustain the air campaign, but also at our ability to stage forces for the ground campaign.

On the runway at Dhahran, F-15 pilot 1st Lt. Steve Kirik happens to look over his port engine just as a Patriot explodes from its launch canister. "It looked like a big, brilliant flare," he tells reporters. "It jumped off the ground, snaked back and forth a couple of times, and then boom! Let's just say my respect for them (the guardian Patriot crews) rose tremendously."

Had the Scuds intercepted by Patriot missiles over Southeastern Saudi Arabia impacted instead on the runways at Dhahran, amid the Saudi port facilities bulging with materiel, atop our supply and refueling depots, or amidst our command, control and intelligence centers, there would have been considerably fewer references to their military insignificance.

Without Patriot, impacting Scuds would have made it much more difficult for us to execute and sustain the air campaign and the buildup that preceded the climactic ground campaign. But for Patriot, impacting Scuds would have disrupted refueling and rearming operations, reducing the number of coalition sorties. In the skies over Iraq, the Scuds might have balanced

INTERCEPT POINT

the odds a little more in favor of the Iraqi air force, reducing the effectiveness of the air campaign while increasing coalition air combat losses.

And imagine the havoc Scuds equipped with chemical warheads might have wrought. Would pilots and flight line crews encumbered by chemical protective gear have been able to sustain such a high rate of sorties? Would longshoremen unloading mountains of materiel have paused to renegotiate their union contracts? One soldier, SSgt. Gilbert Johnston, wrote to me of the gratitude soldiers in our combat support base feel toward Patriot:

"We had no warning the Scud was inbound, when suddenly a Patriot to my left roared off its launcher and veered sharply to its right to impact with the incoming missile directly over our heads at an altitude of not more than 1,000 feet. Debris from the detonation actually landed inside our compound. The missile, sir, was no more than one or two seconds from impacting either right on top of us, or very near us. When our Patriot flashed across the night sky, it was almost as if God had reached out his hand with a lightning bolt and struck it down."

Saddam Hussein, on the eve of the ground war, made it clear that he would have liked Patriot to "get out of town." Among the items in a long list of conditions he attached to a midnight offer of "unconditional withdrawal" from Kuwait was the provision that "all weapons delivered to Israel under pretext of the Gulf Crisis be withdrawn." The reference, of course, was to U.S. Patriot batteries that defended Israel against his terror attacks and Patriot fire units sold to Israel just prior to the outbreak of hostilities. The peace overture was rapidly dismissed, but Saddam was probably correct in thinking that the Arab world is not big enough for both him and Patriot.

On the eve of the ground battle, the 11th ADA Brigade began moving Patriot fire units farther north to provide air defense for staging areas nearer the Kuwaiti and Iraqi borders. However, in perhaps their soundest tactical decision of the war, Iraqi military leaders declined to launch their aircraft to challenge the air defenses that protected the coalition's mighty armored spearheads as they raced across the desert sands.

The lack of aerial targets robbed our Patriot, Hawk and short-range air defense units of the opportunity to prove their lethality against fixed- and rotary-wing aircraft as well as tactical ballistic missiles, but they had already earned the admiration of Desert Storm's combined arms team.

Partly as a tribute to the branch and partly as a show of coalition power, Gen. Norman Schwarzkopf ordered Patriot fire units assembled alongside M-1 battle tanks and Apache attack helicopters at Safwan airstrip, the Gulf War's Versailles. As allied and Iraqi commanders signed the cease-fire agreement — actually a document of surrender — the Patriot crews standing guard over a tent in the land of Babylon had, indeed, earned a place for themselves and for the "First to Fire" branch in history.

During the seven months of Desert Shield and Desert Storm, our Patriot battalions took part in a contingency deployment of staggering dimensions and unprecedented speed. They became the first to fire Patriot missiles in combat, the first to intercept and destroy a tactical missile in flight during combat, and the first foreign soldiers allowed to actively participate in the defense of Israel. During a "textbook war" that amazed the world, they performed their mission with an astounding degree of perfection.

"Thank God for Patriot," President George Bush told a flag-waving crowd of workers at Raytheon's Patriot assembly plant. The president's sentiment is shared today by a lot of people — soldiers, sailors and airmen of Desert Storm, leaders of the international coalition, parents sheltering their children in the sealed rooms of Tel Aviv, diplomats struggling to create a future of peaceful coexistence in the Middle East, and those of us at home who eagerly await the return of ADA soldiers who lived out our motto . . . **First to Fire!**



— Maj. Gen. Donald M. Lionetti
Chief, Air Defense Artillery

Scud Attack!

*There once was a thing called a V-2
To pilot which you did not need to—
You just pushed a button,
And it would leave nuttin'
But stiffs and big holes and debris, too.*

— Thomas Pynchon

"A screaming comes across the sky . . ." So begins *Gravity's Rainbow*, Thomas Pynchon's black comedy epic of technological paranoia. The book's title describes the vapor trail of a Nazi V-2, the world's first tactical ballistic missile, as it arcs over the North Sea toward London.

The threat of ballistic missile attack, dramatically reintroduced by the impact of Saddam Hussein's Scud-Bs, has hung over the globe since the first V-2 reached the apex of its trajectory and, turning pure ballistic, began to nose over.

The Scuds intercepted by Patriot missile batteries in Saudi Arabia are a linear descendant of the Nazi V-2 and the direct offspring of the Scud-A, a missile designed to deliver nuclear warheads over short distances. The Soviet Union shipped Scuds to Iraq in the 1980s when it began phasing the missiles out of its own inventory in favor of the more capable SS-23. The Iraqis extended the Scud's range to approximately 500



Iraq's Scuds proved a poor match for U.S. Patriot batteries.

kilometers for the Al-Hussein model and to about 600 kilometers for the Al-Abbas model.

Iraq fired Scuds at Israeli targets in the Sinai during the 1972 Yom Kippur War and at Iranian cities during the Iraq-Iran War. Scud attacks commenced during the second day of Operation Desert Storm and continued through the first days of the ground offensive.

Why none of the Scuds aimed at Israel and Saudi Arabia were armed with chemical warheads is still a mystery. The answer might be that the Iraqis had not mastered the technology to mount a chemical warhead or that their stockpile of chemical warheads were destroyed before they could be used, but the lack of Iraqi chemical artillery attacks during the ground war suggests they may have feared retaliation.

At the onset of the ground war, Patriot batteries were tentatively credited with knocking down 64 of 65 Scuds that entered their engagement zones. The intercepts sometimes occurred directly overhead (according to unconfirmed news reports, some Patriot crewmen were slightly injured by falling debris). Patriot crews watched the intercepts

live, and then rushed to a television set to see the "instant replay."

While World War II radars were not sophisticated enough to track descending V-2 rockets, today's Patriot operators say tracking Scuds is a relatively easy task. Since Scuds only fly up or down, there's no target identification problem.

Scuds show up on Patriot radar screens as fast moving triangles. Operating in the automatic mode, the Patriot system automatically detects and identifies the incoming Scud and launches missiles when the intercept appears in the high-lethality engagement zone. The tactical control officer (TCO) can verify engagements by moving a cursor to the rapidly descending Scud symbol and then hitting the HOOK button on his keyboard. This gives the TCO amplifying data on the target, including speed, range and altitude. If the TCO elects to continue in the automatic mode, the system automatically fires two missiles to ensure engagement in the engagement zone. This ripple fire occurs less than 10 seconds apart. The Patriot missiles exploding from their canisters appear on the scope as football-shaped symbols speeding toward the Scud at Mach 3.

Patriot's dazzling performance is certain to have a lasting impact on Air Defense Artillery. The Scud intercepts have already lent impetus to the Strategic Defense Initiative in which Air Defense Artillery has a large stake and have done much to enhance the image of the branch as a combat arm.

Patriot's near-perfect performance, meanwhile, has made "Patriot" virtually synonymous with "miraculous" in the minds of Americans. "Unfortunately, we don't have a Patriot missile that can solve all our social ills," former Drug Enforcement Agency head William Bennett told a congressional committee.

With analysts predicting that weapons that performed well in the Gulf War will be virtually immune to budget cuts, Patriot's Persian Gulf virtuosity is sure to help Air

Defense Artillery defend itself against future salvos of defense budget cuts, at least those aimed at its currently fielded and developmental high- to medium-altitude air defense systems.

One thing is certain: the Patriot will be among the most applauded "floats" in the victory parades awaiting Desert Storm soldiers.

In El Paso, Texas, home of Fort Bliss and the 11th ADA Brigade (which supplied most of the Patriot firepower defending Saudi Arabia), the city council voted to rename a major freeway "Patriot Freeway."

The resolution read:

"Whereas, the Patriot missile is acknowledged as a major contribution to the peace of the Free World; and

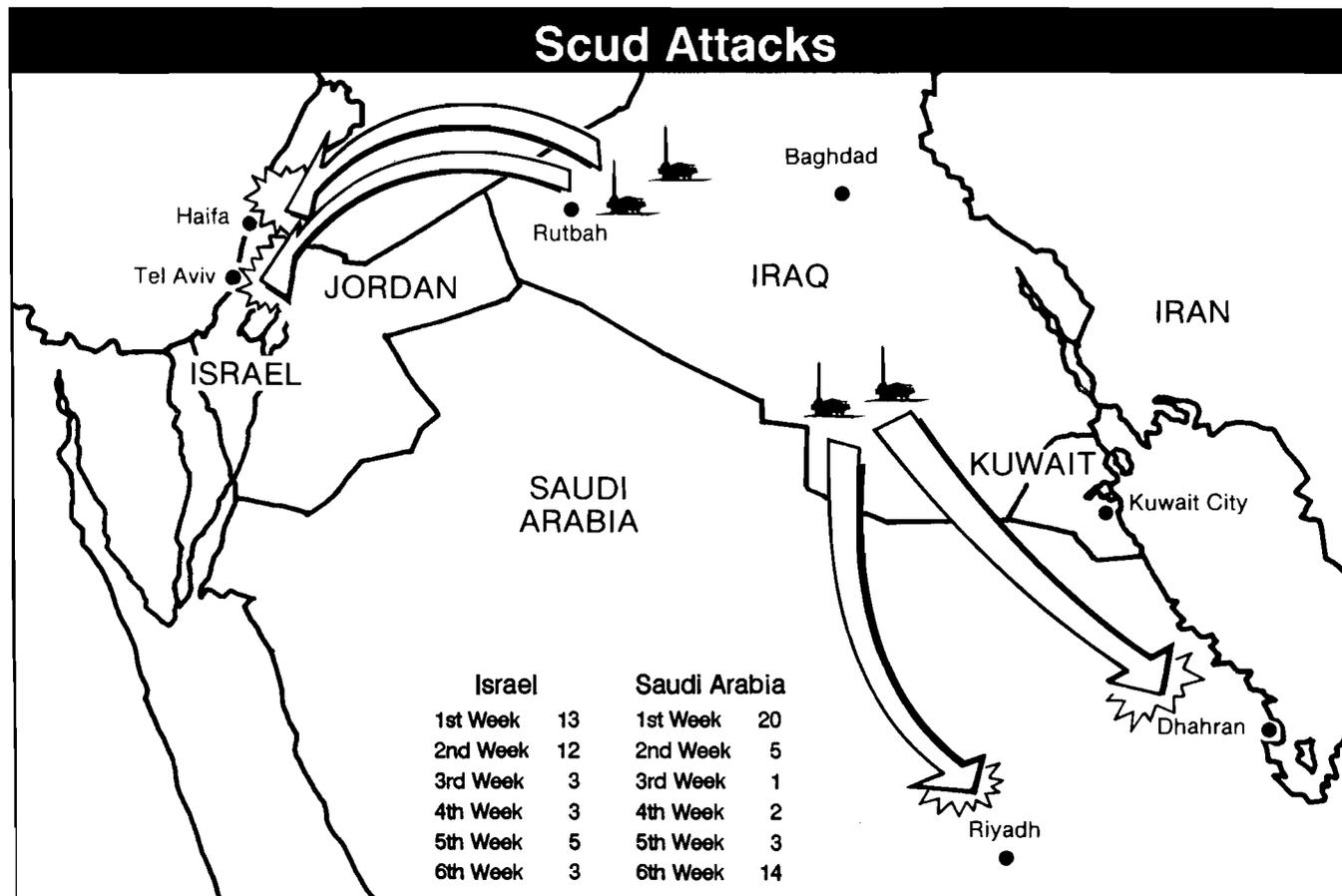
Whereas, the Patriot missile system was perfected in the El Paso area; and

Whereas, Fort Bliss has been the sole training center for the training of military personnel in the maintenance and operation of the Patriot missile; and

Whereas, El Paso is steeped in military tradition by the long-term presence of installations such as Fort Bliss, White Sands Missile Range, McGregor Range and Holloman Air Force Base; and

Whereas, U.S. Highway 54 serves as the gateway to all of these military installations;

Now, therefore, be it resolved: That the El Paso City Council hereby authorizes the mayor to take the necessary steps to name the entire length of U.S. Highway 54, from the Rio Grande to the Texas-New Mexico state line, as the Patriot Freeway."



Desert Storm Air Battle

*Forward area air defense units
starved for targets
in target-rich
environment*



"The Iraqi air force will always remain a threat so long as they have one airplane."

— Gen. H. Norman Schwarzkopf

The ADA units that swept through Kuwait and southern Iraq along with Operation Desert Storm's armored, mechanized and airborne spearheads weren't just along for the ride. During his already legendary Feb. 27 briefing that summed up the destruction of Iraq's army, Gen. H. Norman Schwarzkopf told reporters that coalition strategists never discounted the Iraqi air force in any phase of its operational planning, including the final ground campaign.

In an earlier briefing, the allied commander in the Persian Gulf had told newsmen that "the only thing that's really surprised me, as I've already stated many times, about the Iraqis, is the fact that their air force particularly hasn't chosen to fight. And also how easy it was to completely take out his air defense sys-

tems in such a way that we have freedom of action."

But, Schwarzkopf added, "the Iraqi air force will always remain a threat so long as they have one airplane, but, as Gen. [Colin] Powell stated earlier this week, we have gained and maintained air superiority. We have freedom of action to operate any time we want to up there. And every time they fly, we shoot them down . . . but the threat is always there, and we're never, ever going to assume away the threat."

Although Schwarzkopf told newsmen during the Feb. 27 briefing that, in planning the final ground offensive, coalition planners worried about Iraqi jets interned in Iran and about Iraqi planes and helicopters parked in residential neighborhoods, there were no reports of Iraqi war planes attacking coalition forces as they crashed through, or swept around, Iraqi defenses. And the single glimpse offered television audiences of the "First to Fire"

branch's contribution to the ground campaign was a brief interview with an unidentified 3rd Armored Division Vulcan crewman conducted the morning the Gulf War cease-fire went into effect. The crewman, preparing his track for action amid the smoking ruins of Iraqi Republican Guard tanks, said he wasn't ready to quit — not while Saddam Hussein was still in Baghdad.

While the battle of U.S. Patriot units against Iraqi Scuds made Air Defense Artillery's defense of population centers, rear echelon staging areas, airfields and command, control and communications centers one of the Gulf War's most highly publicized events, the branch's forward area air defense role awaits further assessment. While it's obvious that the Desert Storm operational planners who plotted the climactic ground campaign considered the presence of ADA units vital, or at least comforting, the Gulf War's implications for forward area air defense artillery are ambiguous.

Although the air battle was largely decided the opening night of Desert Storm, the effort to suppress Iraq's air force and air defenses began weeks earlier with clandestine raids by coalition special forces, including British commandos, Army Special Forces and Navy Seals, deep into enemy territory. According to one report, when intelligence experts expressed a desire to inspect the guidance system of a particular Iraq surface-to-air missile, British commandos captured one and returned it intact to coalition lines. The *New York Times* reported that, as the first wave of coalition war planes headed for Iraq on Jan. 17, the raiders shined laser beams at Iraqi radars so that they could be hit by Hellfire missiles fired by Apache helicopters. They were armed, said the *Times*, with 50-caliber sniper weapons so they could attack mobile air defense radar command and control vans.

The air assault against Iraq's air defense system was led by F-4G Wild Weasels and EA-6B electronic countermeasures aircraft that electronically disrupted Iraqi radar and communications. F-117 stealth bombers, F-15E fighter-bombers and A-6 attack jets suppressed Iraqi anti-aircraft defense batteries and demolished Iraqi air bases. Iraq managed almost no effective response to the attack. Pilots reported Iraqi SAMs launched against them were "flying blind." The anti-aircraft gun barrage over Baghdad that so impressed television audiences was ineffective without a credible SAM threat to drive coalition planes down to altitudes where the guns could reach them. The F-15s, F-16s and F/A-18s that flew cover for the fighter-bombers were hardly needed; few Iraqi airplanes sortied to contest the coalition air assault.

More than a hundred of Iraq's best war planes fled to Iran during the early phase of the air campaign, where they generated considerable

paranoia but played no further role in the fighting. Others were hidden — and many destroyed — in hardened bunkers. Others were dispersed in population centers or parked near mosques or archaeological sites to protect them from coalition bombs.

Some concluded Saddam might be saving his air punch for a climactic moment, but it was a punch never thrown. Why, is still something of a mystery. The probable answer is that Iraqi air commanders, or

their pilots, recognized the futility of sending their pilots against the coalition's superior aircraft and pilots. Still, one might have expected the Iraqi air force would have at least made a small gesture at providing close combat support for its ground forces as they were crushed by the coalition onslaught.

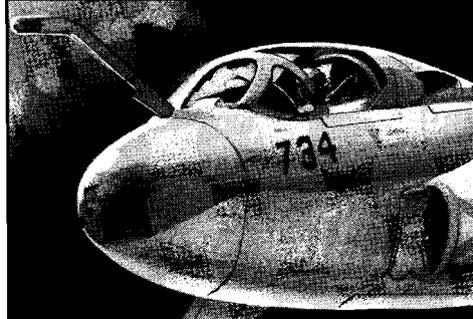
The result is that Desert Storm's forward area air defense units were deprived of aerial targets in an environment described as the "Mother of All Target Opportunities."

Knockout Punch

Iraq virtually conceded the battle for air supremacy after an initial coalition air onslaught, preceded by commando raids, blinded its surface-to-air missile defenses and destroyed many of its airfields.

1

Special forces units, inserted deep inside Kuwait and Iraq, shine laser beams at Iraqi air defense radars. Apache attack helicopters take out radars with Hellfire missiles.

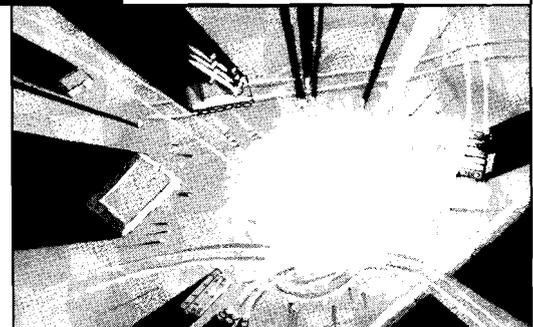


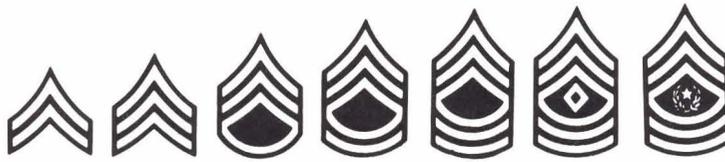
2

F-4G Wild Weasels and EA-6B electronic countermeasure planes disrupt Iraq radar and communication networks.

3

A-6 attack jets, F-117 stealth bombers and F-15E fighter-bombers attack Iraqi airfields and suppress air defense batteries.





ADA FORUM

The ease with which our Desert Storm forces destroyed the Iraqi army in just 100 hours of ground fighting came as a surprise to most people, but no one who visited our soldiers prior to the unleashing of Desert Storm could have doubted that victory was inevitable. Just prior to the Jan. 15 war deadline, I visited Saudi Arabia and many of the Air Defense Artillery soldiers deployed to Operation Desert Shield. The impression I came away with was of a superbly trained and highly motivated fighting force.

It may have been a force that prayed for peace, but it was also a force fully prepared to accomplish their mission by the force of arms.

Traveling more than 2,200 miles in 10 days, I visited more than 30 individual units of the 11th ADA Brigade, 3rd Armored Cavalry Regiment, 978th Military Police Company and 70th Ordnance Battalion. I found that the soldiers' overall morale was high, but in many cases they were tired of the monotonous Saudi desert. However, nearly all of them seemed content with waiting for the order to use the arms they carried or to pack them up and return home. The soldiers were relieved and grateful to hear about the strong public support for the war effort and the many family support activities underway at Fort Bliss and at other Army installations across the nation.

Some soldiers were stricken with boredom; that's where the NCOs came into play. They kept everyone busy improving their sites. The whole thing boiled down to the first sergeants and NCOs going out and scrounging the supplies needed to create a better living environment for their soldiers. The NCOs were taking care of their soldiers, acquiring materials not only for personal safety, but also for recreation.

They ensured the soldiers had access to television sets with video cassette recorders and, in many cases, they used the mess tent for a theater. Some units had even built weight rooms. It was evident the NCOs had the best interests of the soldiers always on their minds.

As the war clouds gathered, NCOs trained soldiers in day to day tasks, and most of those tasks were in preparation for war. Whether the training was making a range card or just entry control to a unit, it went on around the clock. Classes on nuclear, biological and chemical warfare were enhanced due to the possible threat of Iraqi chemical Scud attacks. Scud alerts sounded throughout the sites, often twice a day.

The NCOs were deeply involved with the day to day operations of the site, working hand in hand with younger soldiers and training the young lieutenants to be the best possible lieutenants. Looking back, it's easy to see that our NCOs made working together as a team the basis of Desert Storm's success. Team-

work is the name of the game. By working together you don't set anyone up for possible failure.

When I departed, I felt confident that our soldiers would succeed in every aspect of the coming war, for our NCOs were taking care of business. Starting with the basics of soldier care — the ultimate mission — they were taking all the steps that make success possible. If the soldiers continue doing everything day to day by the standards they've been trained to, and if they didn't deviate from those established standards, I knew that things would go alright for them.

Operation Desert Shield became Desert Storm on Jan. 16 when the coalition launched a mighty air armada against Saddam Hussein's airfields, air defenses



ADA FORUM



and command and control centers. Air Defense Artillery quickly joined the battle and won international acclaim by intercepting Iraqi Scuds launched first at Saudi Arabia and then Israel.

The first Patriot missile was launched by soldiers of the 2nd Battalion (Patriot), 7th Air Defense Artillery, 11th Air Defense Artillery Brigade of Fort Bliss, Texas: the home of ADA. This was not a lucky shot. Soon other Patriot batteries were downing Scuds with astounding accuracy.

Personally I had no fear that the Patriot system would not do what it was designed to do. The majority of the Patriot personnel are seasoned veterans. They had been trained to work under stressful conditions.

Patriot saved lives and equipment and played an important tactical role by preventing the Iraqi Scuds from disrupting our staging and logistic areas. Another, more personal, mission developed after its successes against the Scud attacks. Patriot served as a confidence builder for all our soldiers, because they really knew what the Patriot was capable of doing. Our Patriot battalions were the first to win a reputation for excellence that was soon to be extended to each segment of the Desert Storm combined arms team.

The Air Force is also now a believer in our ADA. They were overjoyed to have the Patriot stationed around their bases because of the possible Scud mis-

sile attacks. The Air Force was willing to help our NCOs get the supplies needed for their soldiers.

Much like other ADA weapon systems, the Patriot is comprised of both officers and enlisted. In the control van where the decision to fire is made, an officer and NCO work together at all times. The officer identifies the aircraft as being friendly or hostile and the tactical control assistant, usually an NCO, fires the missile. Officers and NCOs complementing one another has always been the design of ADA. But the NCO's overall mission plays a more complex and unique role than simply firing a missile.

I felt very proud to be associated with the soldiers I visited in Saudi Arabia. And I felt very confident leaving, knowing the soldiers would do well. They soon demonstrated my confidence was well placed. We just have a great bunch of soldiers and NCOs.

As ADA continues to serve as an umbrella for the Saudi Desert, pending a formal cease fire, the saying 'if it flies it dies' has become a universal motivator for ADA 'Scudbusters.' And for the soldiers, NCOs and officers who maintain and operate the Patriot, they rest assured knowing they have faced their first challenge during Operation Desert Storm with complete success.

— CSM Robert W. Harman
U.S. Army Air Defense Artillery School



Team Patriot

*Patriot's "lesser heroes"
glory in dazzling
Desert Storm showing*

Once a Patriot battery stationed in Saudi Arabia or Israel receives a satellite early warning relayed from Cheyenne Mountain in Colorado, the air defenders have less than five minutes to prepare for the arrival of an Iraqi Scud. The story of Patriot's preparation and deployment to the Middle East is less dramatic but almost as intense.

The near-perfect performance of the Gulf War's most celebrated weapon system has made high-tech heroes of the ADA soldiers who crew Patriot and earned a fleeting stardom for workers who, frequently caught in the glare of network news cameras, continue "surge production" of Patriot parts at Raytheon and Martin Marietta manufacturing plants.

"Thank God for Patriot," President Bush told a flag-waving crowd of 2,000 workers at Raytheon's Andover, Mass., Patriot assembly plant. "I view it as an honor to be here, to come to Raytheon, the home of the men and women who build the 'Scudbusters.' We're very grateful. Because of you, the world now knows that we can count on missile defense. Because of you, a tyrant's threat to rain terror from the skies has been blunted; it's been cut short. Because of you — and this one is special — innocent civilians, priceless human lives, have been spared."

Morale soared at the Raytheon plant when live television broadcasts of Patriot Scud intercepts were beamed to the United States. "I think we just all feel good about the fact that the Patriot is doing its job," said assembly line worker Joseph O'Donnell.

"At first I had a hard time thinking about making weapons that are killing people," said a Raytheon employee. "But now I think about the fact that it's saving our own people and it's for our country."

When Bush was taken on a tour of the Raytheon plant in January,

Patriot batteries had been credited with intercepting and destroying 41 of 42 Iraqi Scuds that penetrated their engagement envelopes. Since 1980, Raytheon's Andover facility has delivered more than 108 Patriot missile systems. The Patriot PAC-2 "Scudbuster" missiles are manufactured at Martin Marietta's plant in Orlando, Fla. The prime contractors, however, are just two of the many players who make up what the U.S. Army Missile Command's Patriot Project Office, Redstone Arsenal, Ala., calls "Team Patriot."

America is enthralled with the tired, dusty, homesick but ever vigilant soldiers who won the "Battle of Riyadh," defended Dhahran and knocked down Scuds over Tel Aviv and Haifa. But Team Patriot has its lesser heroes whose work made it possible for the Patriot crews to perform so brilliantly in the Persian Gulf. Team Patriot consists of thousands of soldiers, federal workers and civilian employees.

When the crisis in the Gulf erupted in August 1990, the first Patriot PAC-2 missiles required to shoot down tactical missiles weren't scheduled to begin rolling off Martin Marietta's assembly lines until early this year. When the deployment alert was received, only three Patriot pre-production missiles were ready, and they were at White Sands Missile Range, N.M., for testing. Patriot soldiers were in the initial phase of anti-tactical missile training. To make matters worse, the associated operational software was geared toward the European theater rather than the Arabian Desert. And efforts to repackage the larger Patriot equipment for contingency operations were only in the design stage.

Team Patriot rolled up its sleeves. Contractors shifted into high gear, running manufacturing and assembly lines around the clock. European co-producers canceled traditional August holidays. The Army

and Air Force pitched in to provide almost instantaneous transport assistance. Warheads were fabricated, using parts that only hours earlier had been in Germany. Trucks roared nonstop halfway across the United States. Chartered aircraft reduced delivery time from weeks to hours.

Raytheon sent technical representatives to Saudi Arabia and Israel to help military personnel install and maintain the Patriot system. Among them was Jack Fanning, the retired former deputy assistant commandant of the U.S. Army Air Defense Artillery School. Fanning rated the morale of Patriot soldiers "sky high" and said the Patriot system was functioning perfectly except for problems with the non-organic generator.

Team Patriot was at work on the generator problem. Issued a desperate order for 22 generators to power Patriot systems in Saudi Arabia, Central Power Company agreed to begin producing the equipment around the clock — and without a final contract. Employees of the Temecula, Calif., firm spent their Christmas holiday loading the generators onto a C-141 transport for a direct flight to the Persian Gulf. More than a month later, Central Power owner Jim Vallely was still wondering when he would be paid. "We're going nuts," he said. "We have a million dollars in purchase orders outstanding, and they [the Army] have no way to pay us, because we have no contract." By dispensing with the red tape, Vallely had done his part for Operation Desert Storm. And Patriot units celebrated the arrival of generators less vulnerable to sand ingestion than the ones they had deployed with.

Sacrificial dedication to getting the job done was the rule; quality was the watchword. The dedication of Team Patriot brought tremendous results.

The first production run of PAC-2 missiles was off the line, not in five months as originally scheduled, but in two weeks. Instead of going to Army depots, they went directly to waiting Air Force jets for the trip to the Persian Gulf. This unprecedented accelerated production and rapid delivery program provided a crucial layer in the Desert Storm armor by supplying PAC-2 missiles to replace those fired at Iraqi Scuds.

At the heart of Patriot is the software that controls the Patriot radar, missiles, communications and other critical functions. Patriot's complex computer coding required urgent tailoring to optimize Patriot's performance in response to the Iraqi threat and desert conditions.

The federal government and civilian contractor team went into action in Massachusetts, Alabama and Texas to develop and test the

changes and to install the new software. New Patriot software releases normally require months of testing and processing prior to release. Six releases were made during the six months of Desert Shield/Storm, and all produced the type of performance soldiers expect.

Early decisions affecting Patriot deployment were based on data representative of European threat scenarios. Evolving intelligence about the Kuwait theater of operations proved to be dynamic, and it showed that Iraq's threats were different from the European model in key performance areas.

The new intelligence data resulted in a temporary interruption of Patriot deployments. Scores of analysts, intelligence experts and computer scientists answered an urgent call to assess Patriot performance in light of this new information. Overnight, simulation models

were modified and validated. Within hours, Pentagon chiefs reviewed computer runs that revealed Patriot could counter the Iraqi threat and decided to continue Patriot deployment, a decision dramatically vindicated by ensuing events.

During the review process, software changes were conceived to improve Patriot's performance. Patriot deployments went back to the top of the priority list, and transport aircraft bearing fire units once again rolled down the runways.

"Team Patriot has turned in a performance that inspires pride," said Patriot Project Officer Col. Bruce Garnett. "When called on, Team Patriot was there. And Team Patriot will always be there until Desert Storm concludes with the liberation of Kuwait."

The Patriot Project Office, located in Huntsville's Research Park, has about 115 soldiers and ci-

Team Players



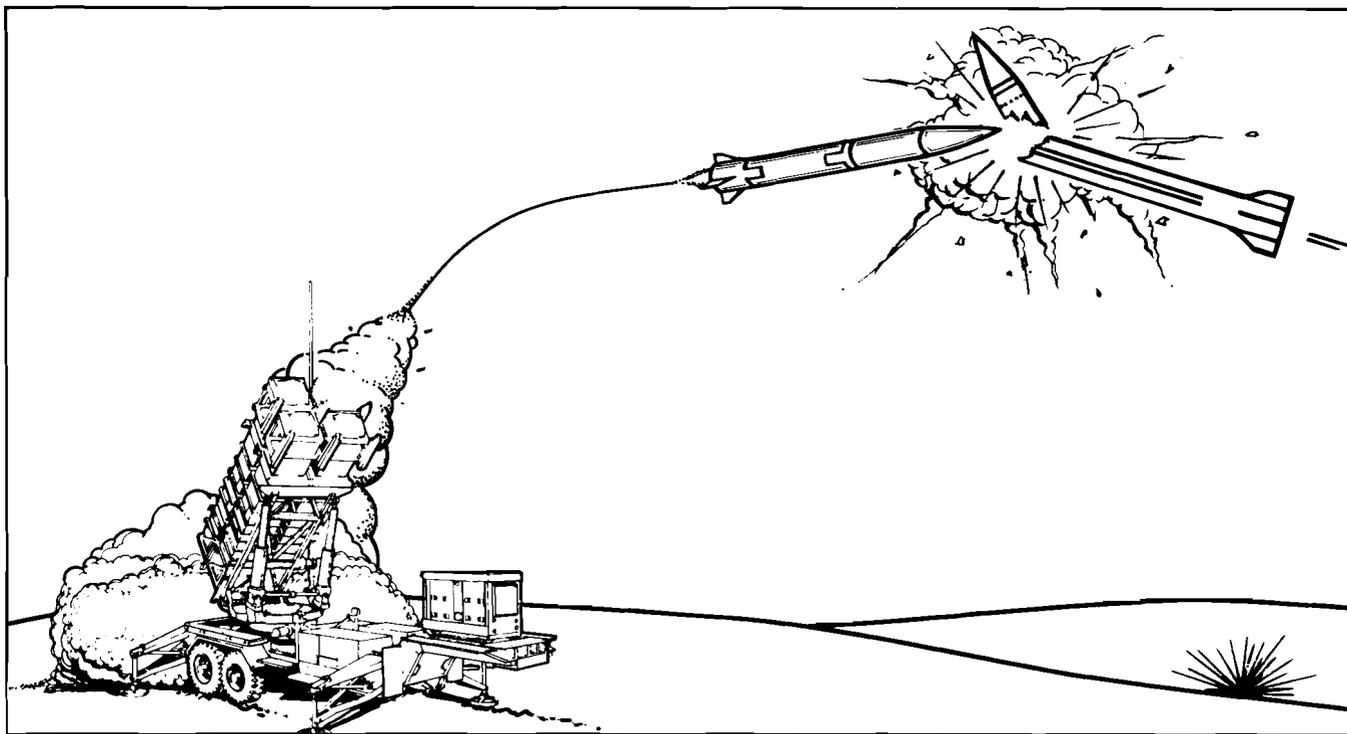
This 11th ADA Brigade Patriot launcher fired the first missile to intercept an Iraqi Scud.

Military Organizations

Secretary of the Army for RD&A
 Department of the Army DCSOPS
 Department of the Army DSCLOG
 Patriot Project Office
 European Support Office
 Patriot Deployment Office
 U.S. Army Missile Command
 Missile Logistic Center
 Software Engineering Directorate
 U.S. Army Materiel Command
 Troop Support Command
 Red River Army Depot
 Letterkenny Army Depot
 Harry Diamond Laboratories
 U.S. Army Air Defense Artillery Center
 and Fort Bliss
 11th ADA Brigade
 32nd Army Air Defense Command
 Military Air Command
 21st Air Force Wing
 22nd Air Force Wing
 Biggs Army Air Field
 Patrick Air Force Base
 Dover Air Force Base
 Ramstein Air Force Base
 German Air Force

Civilian Contractors

Acceleron
 Arrowhead Airways
 Allied-Signal-Aerospace Company
 Atlantic Research Corp.
 Brown International
 CAS Incorporated
 Central Power Co.
 Chamberlain
 Coleman Research Corporation
 Computer Sciences Corporation
 Explosive Trans
 General Machine & Tool Company
 Hazeltime Corporation
 Hi Tech
 Intergraph Corporation
 KDI Precision Products
 Martin Marietta Corporation
 Messerschmitt-Beikow-Blohm
 Progress-Werk Oberkirch AG
 Raytheon Company
 Raytheon Services Company
 Southwest Mobile Systems
 Special Devices Incorporated
 Stesau Laboratory
 Teledyne Brown Engineering
 Thiokol Corporation
 Tri State Motor Transit Company
 TRW Systems
 Whittaker Electronic Systems Inc.



vilian employees. A sign taped over the entrance inside the lobby at the Patriot Project Office on the morning after the first Scud intercept proclaimed "Patriot 1, Scud 0."

"I'm not surprised. We had lots of confidence in the system. We're gratified that it performed so well," said Garnett.

Work on Patriot's PAC-2 missile was accelerated so that it could be deployed in Saudi Arabia. The PAC-2, which stands for Patriot Anti-missile Capability-Phase Two, performed as it was designed. The Jan. 17 intercept of an Iraqi Scud missile was the first combat use of Patriot in its 25-year history.

"I wish we hadn't had to do this at all," Garnett said. "Given the fact it was needed, we are pleased Patriot did as well as it did."

Brig. Gen. Robert Drolet, ADA program executive officer, said, "We had hoped it would not be needed, but it was, and we are extremely gratified that the Patriot system and the soldiers who operate it performed in combat just as we

expected and knew they would."

A.Q. Oldacre, the deputy project manager, said, "I'm extremely pleased that the system performed as it was designed to perform, and it performed that way in its test activity out at White Sands; and of course this is the first use of Patriot in either its antiaircraft role or its anti-missile role. So for the first time it's been used in combat, and we're extremely pleased that it worked as it was supposed to.

"This is the first use of the PAC-2 missile that we accelerated work and production on to get to Saudi Arabia," he continued. "If we had not had the PAC-2 missile there — if we just had the standard Patriot, we might've knocked it off the target, but it would've fallen somewhere else in the area and done damage. But we apparently killed it; we killed the warhead before it hit the ground, so there was no damage that we know of.

"So I think all the efforts we've gone through to get Patriot there have paid off already. Hopefully,

the fact that we've showed how effective it is will be a deterrent to further uses of Scuds against U.S. forces.

"I think this is a result of not only our folks here, but folks all over the command who support us as well. So, I think this is something the command can be proud of," Oldacre concluded. "And I hope we just don't have to use any more of them, but if we do, I feel confident they'll do the job."

While PAC-1 involved only software changes, PAC-2 gave the Patriot missile a new fuze and warhead specifically designed to defeat tactical missiles. Col. V. J. Tedesco, U.S. Army Air Defense Artillery School deputy assistant commandant, told *48 Hours* that the first batch of PAC-2 missiles had already been shipped to ADA units in Saudi Arabia before the first test of the new missile was conducted in the United States.

"Team Patriot" was compiled by *Redstone Rocket* and ADA staff writers.

State of Bliss

Patriot training base euphoric over Scud intercepts

by CWO 3 Larry J. Frady

Col. V. J. Tedesco told *48 Hours* and a national television audience that he wouldn't serve with a Patriot air defense unit because the missile system that's won the admiration of the nation lacks sex appeal. A Patriot missile in hot pursuit of an Iraqi Scud presents a beautiful pyrotechnic display, but set on the graveled parking lots of Fort Bliss, Texas, the Patriot launchers look like mutant dumpsters.

Tedesco, the U.S. Army Air Defense Artillery School's beetle-browed deputy assistant comman-

dant, thinks "Dusters" and "Vulcans," especially the self-propelled models, are sexy. (He won a Silver Star while commanding Dusters in Vietnam and still keeps a model Duster on his desktop.) But not even Tedesco could hide his jubilation over the performance of Patriot crews in Saudi Arabia and Israel from the television camera, nor his admiration for the versatility and accuracy of the high-tech Patriot system.

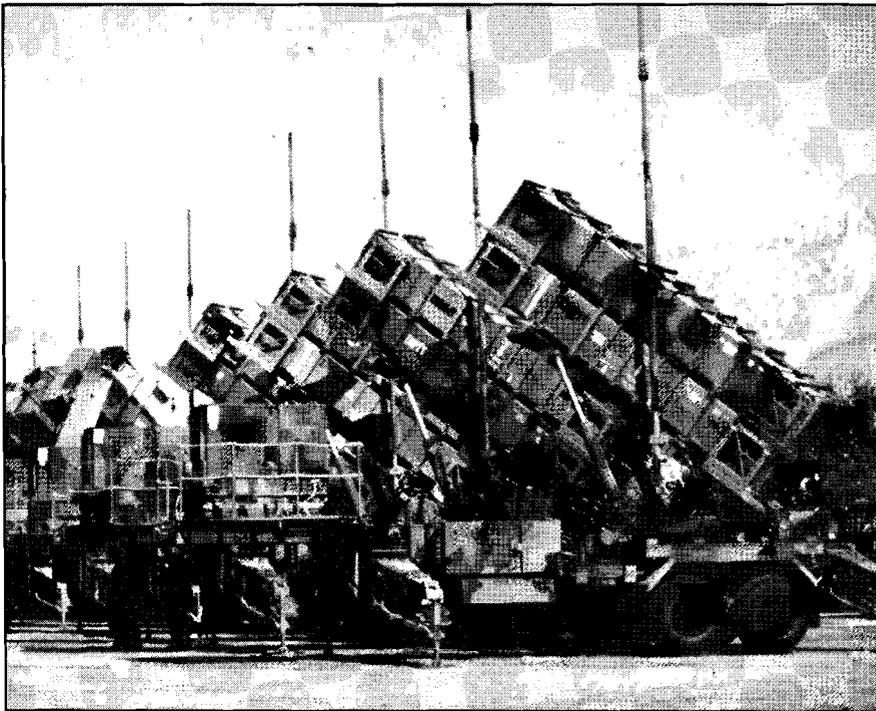
When the first Scud was intercepted and destroyed by a Patriot missile in Saudi Arabia, an enormous sense of pride engulfed the U.S. Army Air Defense Artillery

Center and Fort Bliss, Texas. The desert installation's soldiers and federal employees, working with Raytheon, the prime contractor, and White Sands Missile Range, N.M., developed, tested and fielded Patriot and trained the Patriot soldiers who served in Operation Desert Storm. They also furnished much of the logistical planning and muscle that sent the 11th ADA Brigade's Patriot batteries to the Persian Gulf.

The U.S. Army Air Defense Artillery School and its directorates had particular reason to celebrate, and no one was any prouder than the soldiers of the 6th Air Defense Artillery Brigade. The 6th ADA Brigade sent two Avenger fire units to the War in the Gulf, but that was only a small part of the brigade's contribution to Operation Desert Storm.

Let's go back in time when Patriot was only a fantasy air defense system. Patriot was developed as part of the SAM-D program to replace the aging Nike-Hercules missile system, whose capabilities were lagging behind in late 20th Century technology. The air defense community of Fort Bliss worked with Raytheon to develop a highly accurate and technologically advanced weapon system not only to meet the present day threat, but also to counter the future air threat of the 21st Century.

In 1983, the mission of validating the operational performance of the Patriot system was given to the 4th Battalion, 3rd Air Defense Artil-



Fort Bliss, Texas, is the training base for U.S. Patriot battalions.

lery. To accomplish this mission, the battalion, which later deployed to Germany, had an extremely dedicated group of bright young officers and enlisted soldiers integrated with a diverse group of more experienced warrant officers and NCOs. These warrant officers and NCOs, who had been technicians on the Nike-Hercules or Hawk air defense systems, represented a vast pool of air defense experience. The men and women of 4-3 ADA were indeed the true pioneers of Patriot, and some later deployed with Patriot units to the Persian Gulf.

The 4-3 ADA served as the unit evaluated and furnished the evaluators and data collectors with information during a series of crucial tests at White Sands. The battalion's batteries were constantly under a microscope as they performed movements, emplacements and tactical operations drills on a daily basis. The equipment had to undergo diagnostic technical evaluation after each movement to ascertain its operational status. The battalion pulled maintenance on the equipment from 11 p.m. to 7 a.m. so as not to interfere with test activities scheduled for the next day.

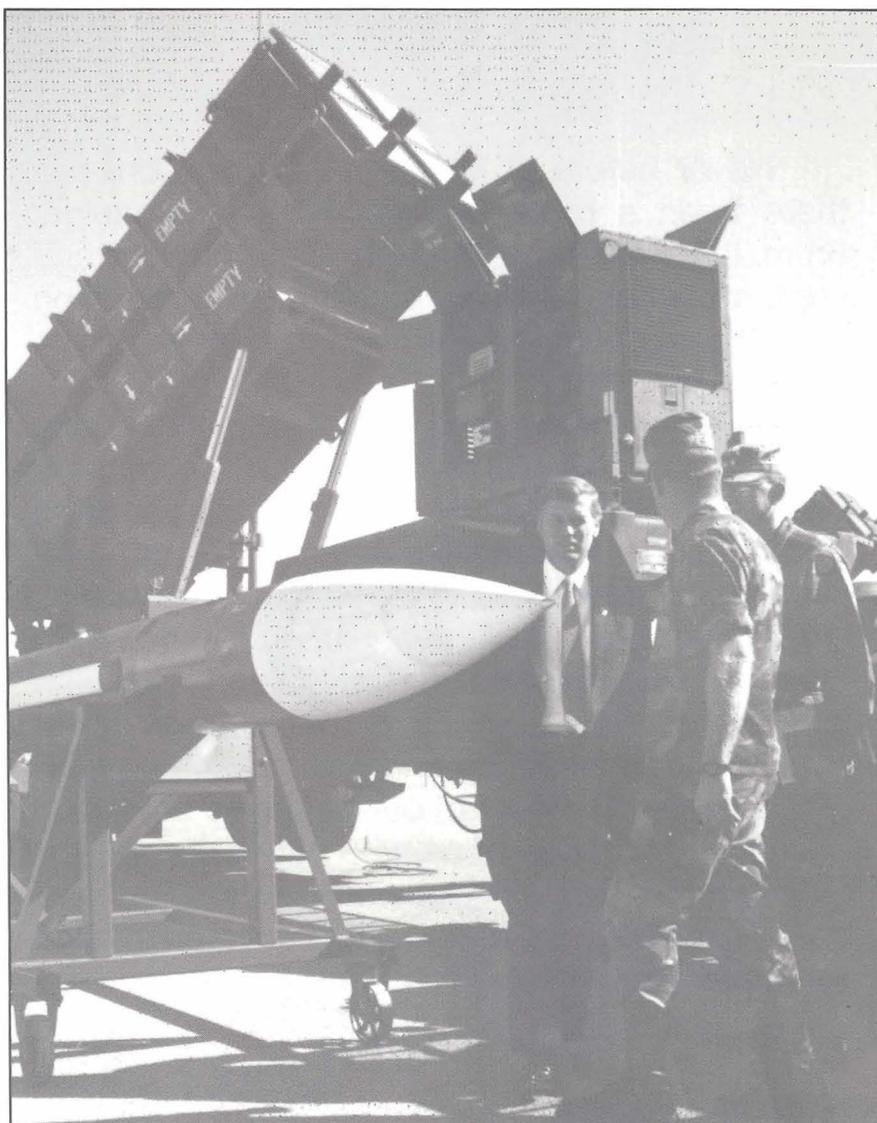
In August 1984, during the final phase of Follow-on Evaluation 3, units of the 4-3 ADA fired Patriot missiles at remotely-piloted aircraft, scoring kills on each target. The battalion had completed its mission of demonstrating Patriot's capabilities.

Even though the follow-on evaluation had ended with successful engagements, many problem areas had been identified. To correct these, the Patriot Project Office, Redstone Arsenal, Ala., and the Air Defense Artillery School intensified their joint search for solutions. The school took the lead in redefining training doctrine while the project office worked with Raytheon to correct system deficiencies. As a result, Patriot received

new software programs and equipment modifications that enhanced its operational performance. The joint working groups continue to meet today on a quarterly basis to allow the Air Defense Artillery School and Raytheon to respond to changing mission requirements and threat developments by constantly upgrading the Patriot system.

Meanwhile, a standardized training program for future Patriot battalions was established. Once again, the Air Defense Artillery School's directorates analyzed data collected

from the 4-3 ADA evaluation and developed a set of standards to guide future training. These standards became Army Training and Evaluation Program 44-635. The mission of training the new Patriot battalions was given to the School Brigade, which later became the 6th ADA Brigade. The brigade developed a 16-week training plan that included several field exercises and periods of intense maintenance instruction. The plan was to train all units simultaneously under a collective training concept and evaluate



Maj. Gen. Donald M. Lionetti and Col. Chuck Ronald accompany Vice President Dan Quayle on a tour of Fort Bliss Patriot training facilities. (Photo by Jeanine Dubnicka)

the battalion periodically against the ARTEP 44-635 standards.

A final certification evaluation and a live-fire exercise climax each training cycle. The live-fire serves a three-fold purpose. It instills soldier confidence in the weapon system; verifies the system's capability in an actual target engagement, and provides missile certification.

To date, the brigade has trained and certified 10 Patriot battalions and six Patriot batteries.

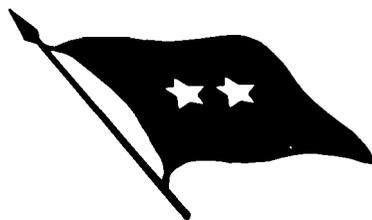
The training does not end with the completion of the collective training cycle, but grows even more intense once the battalions deploy. European Patriot battalions regularly participate in 32nd Army Air Defense Command exercises while the

Fort Bliss Patriot battalions participate in Forces Command exercises. For example, three months prior to their deployment to Saudi Arabia, the 11th ADA Brigade Patriot battalions took part in Exercise Roving Sands, a giant joint interservice exercise that served as a perfect warm-up for Operation Desert Storm. The Fort Bliss Patriot battalions, prior to their Operation Desert Shield deployment, also provided personnel and equipment to test new software upgrades and equipment modifications, a mission they will re-assume upon their return from the Persian Gulf.

Fort Bliss officials spent the weeks immediately following the first Scud intercepts showing off Patriot and the Patriot training base to reporters, television cameras and VIPs, including Vice President Dan Quayle. As Scuds impacted in Tel Aviv, one reporter asked if Israeli Patriot crews reported to be training "somewhere in Texas" were being trained at Fort Bliss. "I can't answer that," said an installation spokesman, "but I can tell you that every Patriot soldier anywhere in the world was trained at Fort Bliss."

During the interviews and photo opportunities, Fort Bliss commander Maj. Gen. Donald M. Lionetti, Tedesco and others stressed the same point. The billions of defense dollars poured into high-tech weaponry paid off handsomely in the Persian Gulf but, as evidenced by the near-perfect performance of our Patriot crews, so did the millions of dollars poured into the training base. High-tech training is as important as high-tech weaponry. That's a point they hope the budget cutters will remember as they go about trimming defense spending in the aftermath of Desert Storm and the collapse of the Warsaw Pact.

CWO 3 Larry J. Frady is stationed with the 6th Air Defense Artillery Brigade, Fort Bliss, Texas.



Never before in history, in my opinion, has there been a more brilliant military campaign. From the President, through General Schwarzkopf, to leaders at every echelon, this operation was expertly planned and flawlessly executed in every dimension.

All Americans can be justly proud of the decisive victory achieved by our Armed Forces over Iraq's blatant aggression. At Fort Bliss we burst with pride in the performance of all our soldiers . . . those who deployed with our major units, individuals from virtually every organization, and in the reserve component units which mobilized with us. And, of course, we have special pride in the courage, independence and enthusiastic support of the family members of our deployed soldiers.

Finally to those of us who supported Desert Storm from here — our outstanding soldiers and civilian workers — well done! I'm honored to have served with you through this crisis.

Maj. Gen. Donald M. Lionetti
Cdr, U.S. Army ADA Center & Fort Bliss

Into the Storm

ADA publications to tell missing saga of Operation Desert Storm's forward area air defense units

During the opening weeks of Operation Desert Storm, divisional air defense units and HIMAD ADA task forces organized to cover the maneuver force in the forward area disappeared from Central Command briefings, television screens, press reports and the pages of *ADA* magazine. No doubt the forward area air defenders cheered as Patriot battalions defending Dhahran, Riyadh and Tel Aviv smashed Saddam Hussein's Scud offensive, but one could hardly blame them if they felt somehow ignored.

During the opening phase of Desert Storm, echelon above corps (EAC) Patriot batteries got all the action and the glory as well. While the activities of air defense units positioning themselves for the ground battle were cloaked in official secrecy, EAC Patriot crews fought their war on prime time television.

Now that Desert Storm has spent its fury, *ADA* plans to tell the story of forward area air defense units — and what a story it should be! But its telling will largely depend on the willingness of units returning from the combat zone to contribute narratives and photographs. Media coverage of forward area air defense units was meager while reporters and television cameramen, who were denied easy access to forward deployed units, lavished their atten-

tion on ADA units defending airfields, staging areas and population centers.

Assuming that the magnitude of the coalition victory permits the quick return of ADA units, *ADA* magazine hopes to begin correcting the imbalance beginning with its annual May-June yearbook edition. Maj. Gen. Donald M. Lionetti, chief of Air Defense Artillery, has also authorized a special, magazine-size edition of *Arabian Knights*, the

U.S. Army Air Defense Artillery School newsletter produced especially for ADA units in the Persian Gulf. Our goal is to make the final issue of *Arabian Knights* a full accounting of the ADA experience in Operation Desert Storm.

Upon their return from the Persian Gulf, ADA commanders will receive letters from the Office, Chief of Air Defense Artillery, asking their help in producing the publications.





VAPOR TRAILS

Patriot

The government of Saudi Arabia signed a foreign military sale in November for approximately \$1.1 billion to purchase the Patriot missile. This sale expands Patriot's role in the defense of the United States and its allies and provides multipurpose air defense capabilities against aircraft, cruise missiles and tactical ballistic missiles.

In December the U.S. Army Missile Command awarded a \$513 million contract for Patriot missiles and ground equipment to Raytheon Company's Missile Systems Division, Bedford, Mass., to build the Patriots.



The contract calls for eight Patriot fire units and associated missiles. A fire unit includes a phased array radar for target detection, tracking and missile guidance; an engagement control station, which is the command and control center for firing operations; an electric power plant; an antenna mast group; and up to eight launchers with four missiles each.

Patriot is the Army's newest and most advanced air defense system and constitutes the backbone of NATO's air defense in Europe, where it has been deployed since 1985.

Other countries that have acquired the Patriot missile are the Netherlands, Germany, Japan, Italy and Israel.

— *The Redstone Rocket*

Brilliant Pebbles

Hughes Aircraft Company has been selected by Lawrence Livermore National Laboratory to conduct a major development phase in the Brilliant Pebbles space defense program.

Hughes, a unit of GM Hughes Electronics, won the two-year, \$50 million contract for design, integration and flight testing of a Brilliant Pebbles experimental vehicle against simulated ICBM targets. Brilliant Pebbles is a plan under which an array of small space vehicles, no larger than tactical missiles, would be deployed in orbit to intercept and destroy incoming missiles before they reached their targets.

Most of the work, including the integration of the flight vehicles, will be done at Hughes' Missile Systems Group engineering facility in Canoga Park, Calif.

— Hughes

PAWS

Soldiers of the 31st Air Defense Artillery Brigade took to the field this winter and got their "PAWS" on one of the Army's newest equipment systems.

The new equipment, nicknamed "PAWS" for Portable ASAS Work Station, is designed to enhance the command, control, communications and intelligence (C³I) function of the III Corps air defense unit, according to brigade training officer Capt. Richard H. Brisbon.

ASAS, itself an acronym for All-Source Analysis System, provides a greater capability for intelligence preparation of the battlefield, giving commanders more flexibility in their positioning of unit assets.

VAPOR TRAILS

Brisbon also said he anticipates the "marrying" of the PAWS equipment to the Maneuver Control System through the Mobile Subscriber Equipment communications network, sometime in the future.

"This gives the commander a graphic picture of the battlefield when he deploys his units," said Brisbon.

Through PAWS, operators can incorporate defense design and intelligence summaries into one program, he explained. This would include both the area ground defense posture as well as the air defense umbrella the brigade provides for III Corps.

As the troops of Headquarters and Headquarters Battery, 31st ADA Brigade, were moving to the field site, their counterparts in the brigade's two battalions were commencing operations in the Battle Simulation Center, in support of Golden Saber. This is HHB's second winter field training exercise (FTX) this season.

The field training with PAWS was viewed as a bonus, since it is not tied directly into the overall Golden Saber exercise. It is the capstone to three days of classroom training in garrison prior to the FTX.

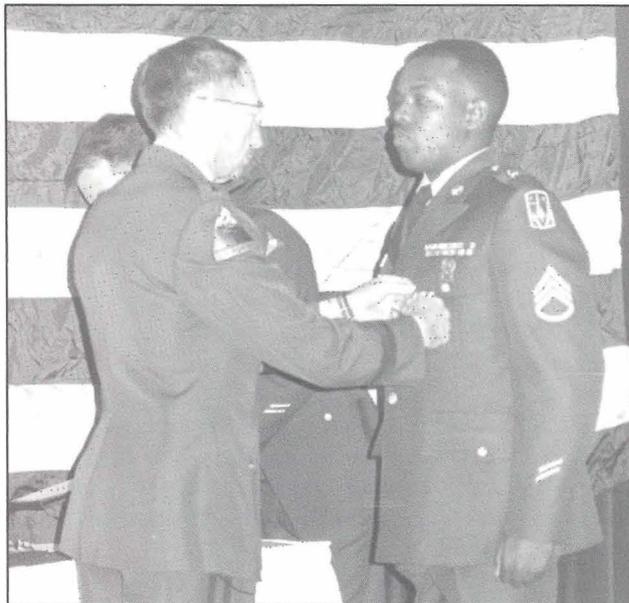
"We all received the same training on the system," said SGM Joseph Jenkins, brigade intelligence sergeant major. "That took three days, but this is the first exercise with the system."

— Jim Boling

31st ADA Brigade First

The first air defender has been inducted into the prestigious Forces Command Sergeant Audie Murphy Club. SSgt. Benjamin J. Smith, a Chaparral missile system squad leader of B Battery, 2nd Battalion, 2nd Air Defense Artillery, 31st Air Defense Artillery Brigade, Fort Hood, Texas, joins the elite organization after rigorous screening by boards of senior noncommissioned officers to become the brigade's first inductee since the unit was reactivated in April 1988.

Those selected for Audie Murphy Club membership are chosen for their outstanding leadership qualities, professionalism and technical and tactical proficiency. Murphy, a hero of World War II, was the most decorated U.S. soldier of all time, winning 33 military awards, citations and decorations, along with three French and one Belgian medal.



SSgt. Benjamin J. Smith, B/2-2 ADA, 31st ADA Brigade, receives an Army Commendation Medal from Lt. Gen. Richard G. Graves, Commander, III Corps, upon induction into the FORSCOM Sergeant Audie Murphy Club.

Smith joined the Army from Farnville, Va., six years ago. He has been stationed at Fort Hood for the past 11 months, having previously served with the 3-4 ADA in Germany.

Having a 31st ADA soldier break the ice by his selection for such an honor only seems more appropriate in this day and time, as Air Defense Artillery has proven itself in Operation Desert Storm.

— Jim Boling

Called for Duty

The year was 1942, and the world was at war. That year marked the last time a line unit from the 85th Division (Custer) was called to active duty.

On Jan. 25, 49 years later, the 1st Battalion, 335th Regiment (BCT), stationed in Granite City, Ill., received a similar call. Within three days the 120 men and women from the St. Louis metropolitan area found themselves stationed at Fort Bliss, Texas, with a new headquarters in Logan Heights. Days later the battalion began to accept the first of 600 reservists.

VAPOR TRAILS

The unit's mission is to provide command, control, logistical and administrative support for all Individual Ready Reserve soldiers reporting to Fort Bliss.

The initial training cycle for the IRR soldiers lasts for 12 days. The first three days the IRR soldiers return to duty are filled with in-processing. On the fourth day, the 1-335 Regiment conducts retraining on 27 different common tasks including first aid; nuclear, chemical and biological defense; land navigation; and weapons. The soldiers are also provided with primary marksmanship instruction and then qualify with the M-16 rifle.

At the end of the 12 days, the commander of the 1st Battalion certifies that the IRR soldiers have met training criteria and are deployable. The majority of the soldiers will receive orders for a new post, and the remainder will stay at Fort Bliss to complete MOS refresher training.

The 1-335 Regiment (BCT) is proud to be a part of the Desert Storm effort, and looks forward to returning to the intersection of the Missouri and Mississippi Rivers at the successful completion of this mission.

— Maj. Theodore G. Osuniga Jr.

Dragon Slayers Gather

Dragon Slayers gather at McGregor Range, N.M., approximately 30 miles north of Fort Bliss, Texas. A Dragon Slayer is a member of the New Mexico Army National Guard assigned to one of the five battalions that possess the short-range air defense (SHORAD) Chaparral missile system. Dragon Slayer is a term adopted by the Guard members that positively identifies them as Chaparral crew members.

Currently, 25 well qualified and highly motivated Slayers are receiving advance instruction on the Chaparral missile system. The two-week period of instruction covers such topics as aircraft recognition, Chaparral system orientation, auxiliary power system, swimming and fording procedures, maintenance functions, missile inspection and handling procedures.

These select Guardsmen receive this instruction under a program called School House of the Soldier. The SHOTS program offers each soldier student many valuable hours of actual hands-on training. This

method of instruction has proven beneficial to both the National Guard and its members. It allows a soldier to become fully functional and familiar with his job responsibilities in a relatively short time.

Upon completion of this intensive two weeks of training, the Dragon Slayers are returned to their home units. At home stations they become on-the-job trainers, and train their fellow Guard members. This enables their units to maintain both a high state of readiness and job proficiency. According to Senior Instructor, SFC Ernest Godfrey, C Battery, 3-200 ADA, Farmington, N.M., "excellent training and a quick method to get the soldier proficient. I know when a soldier leaves our school he has the knowledge necessary to perform his primary duties."

SSgt. Manuel Acosta, a full-time Readiness NCO from Headquarters Battery, 2-200 ADA, Las Cruces, said, "SHOTS is a very good program. When I came here I did not know what to expect, but now that the school is about over, I feel that I can now go back to my unit and teach others." MSgt. John Garcia, NCO in charge of the school, stated, "Getting everything ready for school is one big headache, but once the students arrive and instruction begins everything seems to fall into place. Also, part of our training is to motivate the soldier, so that he may motivate his fellow soldiers."

SHOTS is not a new program for the National Guard. Actually this program began about five years ago when new equipment transition began. According to the state CSM Tom Garcia, this program gives the Guard well qualified soldiers, who are ready to go to any part of the world on a moment's notice to slay the dragon.

— Col. Ezequiel (Zeke) Ortiz

Missile Systems go to Turkey

U.S. Air Force C-5 Galaxy aircraft left for Turkey in February with German anti-aircraft missile systems, completing a Bonn airlift to defend its NATO ally against possible Iraqi attack. A German Defense Ministry spokesman said the aircraft took off from Frankfurt airport with Roland and Hawk systems for the southeastern air bases of Erhac and Diyarbakir.

— Reuters

Homecoming!

Soldiers of the 2nd Battalion, 7th Air Defense Artillery, and 3rd Battalion, 43rd Air Defense Artillery, were among the first soldiers deployed to the Persian Gulf and among the first to return. A mammoth United Airlines 747 bearing the "Scudbusters" who won fame by destroying Iraqi Scud missiles over Saudi Arabia touched down at Biggs Army Air Field, Fort Bliss, Texas, at 8:50 p.m., March 8.

Theirs was a homecoming scene being re-enacted all across the nation, a scene that will be replayed for weeks and even months as America's victorious legions return from the War in the Gulf. A flag-waving, placard-bearing throng of thousands, with clouds of yellow balloons and clusters of red, white and blue balloons floating overhead, had been waiting for hours.

"You can hug them and kiss them, but don't hurt them," admonished Maj. Gen. Donald M. Lionetti, chief of Air Defense Artillery, over the public address system. When the flight crew threw open the door of the commercial airliner, the crowd surged over the restraining ropes and massed about the base of the aircraft.

The soldiers, clad in desert battle dress uniforms with M-16s slung round their shoulders and their faces chapped from desert winds, descended the debarkation ramp into a sea of joyous, upturned faces. Stuffed tigers and teddy bears peeking out of duffle bags added a note of incongruity. Wives held aloft babies, some of them born during the seven-month deployment. Hus-

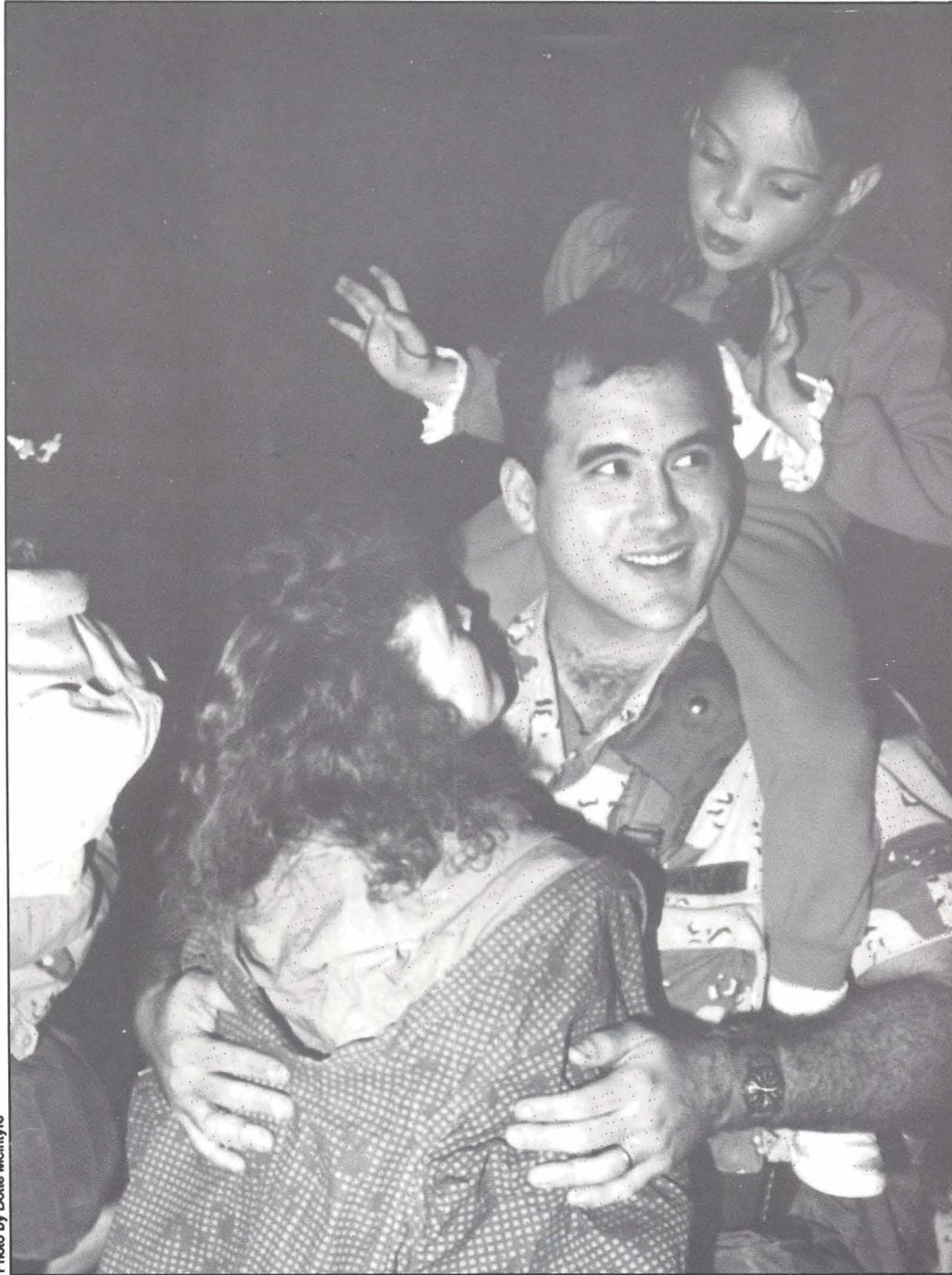


Photo by Dotte McIntyre



Photo by Michael Pike

bands greeted conquering heroes. Awkward teenagers overcame their inhibitions and actually “hugged dad” in front of other teenagers.

The homecoming was carefully orchestrated by senior officers and NCOs who remembered the cool reception Vietnam veterans received when they returned from the jungles and rice paddies of Southeast Asia, and they were determined to make this homecoming everything theirs was not — a homecoming that Desert Storm soldiers will cherish all their lives.

The only problem with the homecoming party is that it's tough to stick a hero label on U.S. soldiers — they keep shrugging it off. While soldiers of other nations celebrate victories — and even defeats — by firing their rifles into the air, U.S. soldiers look for a place to turn theirs in. Everybody kept telling them that they were heroes, and of course they are, but few seemed to be buying it.



Photo by Stretch Thompson



"It was a total team effort all the way," said a lieutenant. "The important thing is that we had a job to do, we did it, and we brought everybody back with us."

They were aware that they had accomplished something special, they were elated to be home, and they were appreciative. They hung around to hear all the nice things the general, the senator and the mayor said about them from the speaker's rostrum. But they had things to catch up on.

"What's the first thing I'm gonna do? Why, first I'm going to hug my wife and kids, then I'm going to find a place to turn in my weapon, then I'm going to grab a beer, and then I'm going home," said a sergeant.

Most of them did just that. A part of them, of course, was still in Saudi listening for the air attack sirens or watching for the pyramid symbol of an incoming Scud as it starts to slide down the radarscope, but even that part will be home soon.

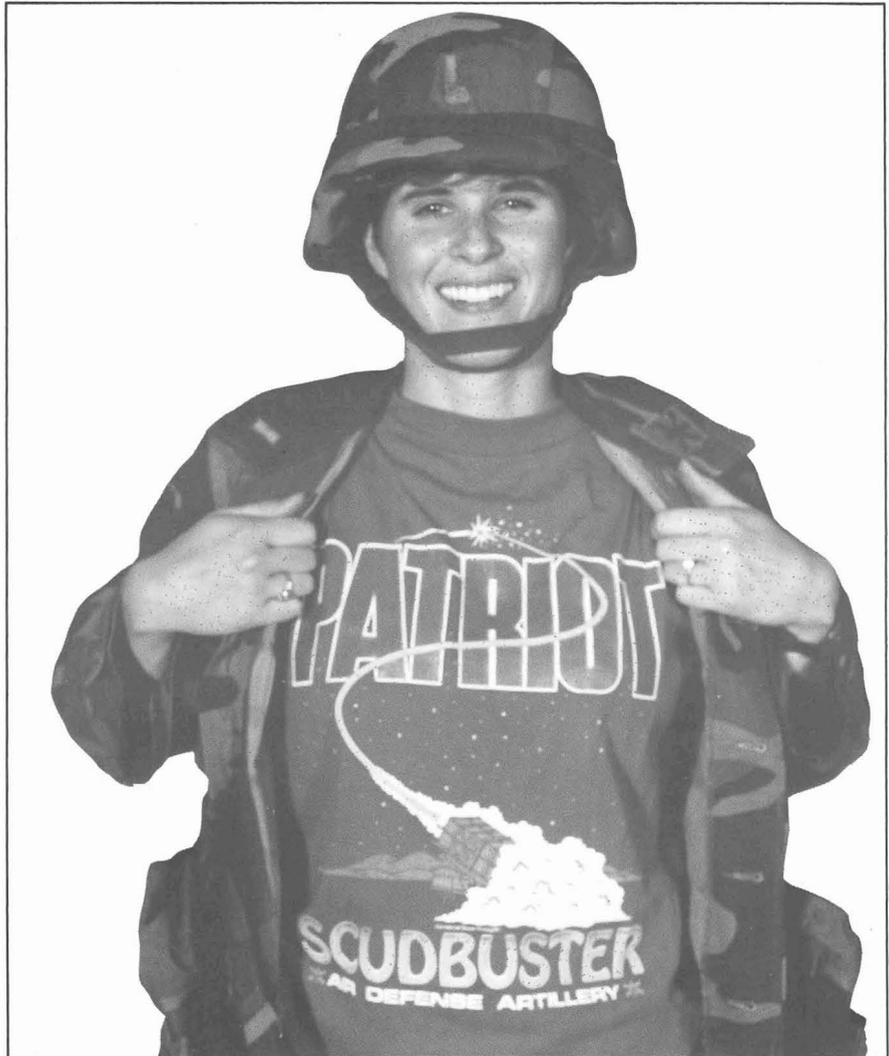


Patriot Mania!

*'Scudbuster' fuels
Desert Storm
memorabilia
craze*

The wave of patriotism sweeping across the United States is no longer restricted to flag waving and yellow ribbons. Americans are rushing to buy Desert Storm T-shirts and scale models of the Gulf War's high-tech weapon systems. The first Desert Storm board game is already on the shelves. And the nation's top baseball card manufacturer has produced a new lineup of "heavy hitters" that features Desert Storm weaponry. Even a miniature Scud, Patriot's chief antagonist in the Persian Gulf, is an industry bestseller. While the Desert Storm memorabilia mania isn't limited to a single weapon system, U.S. Patriot, perhaps because the public views it as a weapon that saves rather than takes lives, is one of the clear favorites.

Raytheon and Martin Marietta stepped up production of real-life missiles to meet the demands of the war in the gulf. There has also been a flood of new orders from countries impressed with Patriot's blazing intercepts of Iraqi Scuds over Saudi Arabia and Israel. Patriot production lines are also running at surge capacity at Estes Industries.



2nd Lt. Jacquie Ostrowdzki models the ADA Association's "Scudbuster" T-shirt.

The Penrose, Colo., company markets the world's first solid-propellant, flying scale model of the Patriot.

The 1/10-scale replica reaches altitudes of 600 feet and features a portable launch pad and an electron beam remote launch system while the 21 1/4-inch red, white, black and yellow rocket comes with a plastic nose cone and a 12-inch recovery parachute.

"The calls from our customers requesting the Patriot have been extraordinary," says Estes President Bob Buroker. "Before our design team had even developed the first prototype, we had some of the

heaviest orders in company history for this rocket."

The Iraqi Scud is a "dangerous dinosaur" whose roots trace back to the Nazi V-2 rocket that terrorized London during World War II. Today, so the joke goes, the Scud is, perhaps, the Gulf War's most accurate weapon system ("because every time it's fired, it hits a Patriot"). The dramatic duel between Patriot and Scud has made the once lightly regarded Soviet-designed Scud a heavyweight in the miniature model industry.

Think Iraqi President Saddam Hussein had problems scrapping together enough undamaged Scuds to

keep his tactical ballistic missile terror campaign going? Bernard Paul of international Hobby Corp. faces an 18,000-order backlog for his 5-inch scale replica Scud missile and launcher. "People are going crazy over it," says Paul, who reports his Philadelphia firm is getting 3,000 orders a day.

For those who want to run the whole show rather than individual weapon systems, TSR Incorporated of Lake Geneva, Wis., offers a colorful board game titled "A Line in the Sand." The game, which has five different scenarios, includes a full-color mounted map board of the Arabian Theater of Operations and 162 stand-up counters representing coalition and Iraqi forces.

TSR, best known for its "Dungeons and Dragons" series, furnishes two separate rule books, one for a diplomatic and one for a combat resolution of the crisis. "Nobody knows what Saddam Hussein will do next," explained "A Line in the Sand" designer Paul Lidberg. "One day he promises diplomatic reconciliation. The next day he cuts off our embassy and creates a 'human shield' with innocent civilians and POWs. In the game, players react to actions just as unpredictable."

The company's media promotion kit for "A Line in the Sand" includes a miniature U.S. flag and dedicates the game to "the brave men and women of the U.S. Armed Forces who place their lives on the line for their country every day, and can never get enough of our respect." Public Relations Manager Thomas McLaughlin said TSR has shipped hundreds of free books and games to Operation Desert Storm soldiers and plans to send more as it receives letters from soldiers stationed in the Persian Gulf.

Upon their return, soldiers who man the "Scudbuster" Patriot batteries may find themselves besieged by trading card enthusiasts asking

for autographs. With Patriot battling nearly a thousand against Iraqi Scuds, it's virtually certain that Patriot will be one of the most sought after trading cards in a new series now being produced by Topps, the giant of the bubble gum card industry.

The eagerly awaited trading cards, featuring weapons systems pounding Saddam Hussein's forces in Kuwait and Saudi Arabia, are so much in demand that the Brooklyn-based company quickly ran out of publicity photos and resorted to sending editors who asked for reproductions the cards themselves.

"Scudbuster" T-shirts, meanwhile, have become the rage of the

legible clothing industry. Maj. Gen. Donald M. Lionetti, chief of Air Defense Artillery, added final design touches to the Air Defense Artillery Association's "official" Scudbuster T-shirt, but the Association has plenty of competition across the country from freelance entrepreneurs hawking other "official" versions of the T-shirt. The association shipped hundreds of T-shirts free to Patriot batteries in Saudi Arabia and Israel. The "most official" are arguably the ones being worn by Patriot crews who actually fired the Patriots that downed the Scuds. The Associated Press took a group photo of Patriot soldiers — each one of them decorated for



Estes Industry's scale-model Patriot reaches altitudes of 600 feet.

intercepting Scuds over Saudi Arabia — holding aloft red, white and blue Scudbuster T-shirts. The photo ran in papers across the country.

Patriot crews, by now, are prob-

ably inured to being interviewed. They can spend the first weeks after their return from the Persian Gulf pasting up scrapbooks with newspaper clippings of their exploits. Some

crew members have been on television so often that they may be eligible for Emmies. One television broadcast that seemed to epitomize the “high-tech” nature of Desert Storm’s air campaign showed a Patriot crew watching an “instant replay” of their just completed Scud intercept on a television set equipped with a VCR.

Desert Storm Patriot crews have also made “Scudbusters” part of the language. “Scud bait” is Desert Storm terminology for television reporters in the grandstanding habit of broadcasting live from atop Dhahran rooftops during Iraqi Scud attacks. Desert Storm crewmen take shelter in “Scud shelters,” sandbagged culvert sections.

Patriot has also inspired an outpouring of poetry. One of the best poems was written by an anonymous airman who dropped the verse off at a Patriot engagement control station and walked away before anyone thought of asking him his name.



“A Line in the Sand” offers both a diplomatic and combat solution to the Gulf Crisis.



COLLECTORS' FAVORITE. The War in the Gulf has spawned new bubble gum card heroes.

To Patriot

*It's hard to sleep in this here town
When Saddam throws his Scuds around
Several nights they woke me up
With missile shots and booms and such.*

*This generated great concern
Because, I guess, we're slow to learn
What Army folks have tried to say
“We have the world's best ADA.”*

*Thanks much guys, we owe a lot
To all of you and Patriot.*

*I'll tell you now there's quite a few
Who'll be around because of you
Your dedication and your drive
Have helped us all to stay alive.*

*When this war's done, with any luck
We'll be around to help pack up
And head for home on boat or plane
Knowing that we beat Hussein.*

*We're glad you're here, that's sure true
You're doing good. This Bud's for you!*

Saudi Arabia, 1991

Air Defense Artillery

DEAR ADA

(Continued from page 1)

MAJ Larry Kimmich, a reservist with the 383d Quartermaster Battalion, described his wartime experiences to former co-workers at the U.S. Army Air Defense Artillery School, Fort Bliss, Texas.

Thought I would drop you a line. I am doing fine and so is Patriot. We hug them daily. We get bombed nightly.

We have been very busy keeping fuel for the air war. It will be a bigger mission when the ground war starts.

Camels run free here. Shepherders are everywhere. Terrain is flat; no trees or shrubs to be found. It rains alot and is very, very cold.

Everyone (civilians) has gone south. All soldiers are moving north. We expect "Saddam Hussein" to fight back eventually.

Not much else to say. Time flies when you're having fun!

Maj. Mark Wise of the 11th ADA Brigade wrote to his daughters, Stefanie and Kristiana, and son, Mark, from Saudi Arabia.

I was very sad to hear you girls cry on the tape. You have to know that I'm here not because I want to be but because I have to be. We have to stand up to this bad guy and stop the nasty things he is doing to people just like you and me.

I'm sorry you have to hurt, but we all have a job to do, even you guys. You are part of this effort. You have to be stronger than ever before. We have to all be strong to help save this world.

I'm proud to be an American, and to be here doing my part. You guys be proud to do yours. I'm proud of you. Hopefully, this will be over and I'll be home soon. But I'm not coming home 'til my job here is done. I know that's what you'd want me to do.

I'll send more pictures soon. You guys send some more. I'll keep my eyes open for more camels. Take care, guys.

Love,

Dad

SFC Frank Beakes of the 11th ADA Brigade wrote to his son Brian on Jan. 21, the night his battalion intercepted Scud missiles targeted at Dhahran, Saudi Arabia.

I'm writing to you, but this letter is for all the husbands and wives, moms and dads, brothers and sisters, families and friends of the soldiers of the 11th Air Defense Artillery Brigade's Patriot battalions.

It's quiet now. The sun has broken through the early morning mist. Everything seems normal; the radio is playing, birds are singing and a cool breeze clears the air of the smoke of the night before.

It was an electric evening, Sunday, 20 January. Everyone was listening to the AFC football game. At 2150 the word was passed: "Scud Alert" and the sirens sounded. We'd practiced the drill. We knew of the real attacks from reports of the days before.

Over the past few days, the city of Dhahran had been targeted by Iraq. Incoming missiles were detected, Patriot missiles launched and intercepts made.

This night seemed to be no different. We waited anxiously for the "all clear" and the follow-up news reports. Within minutes, the word was broadcast. There had been three inbound Scud missiles directed at Dhahran. Once again, Patriot had accomplished its mission. Everyone breathed a sigh of relief and waited for the continuation of the football play-off. For many of us, it was time to reflect on our training, settle our nerves and say a silent prayer of thanks. The clock seemed to tick a little faster and the radio now gave the play-by-play of the football game.

0040: The "voice" once again flatly states "Scud Alert . . . Scud Alert" and the sirens wail. There is no hesitation. Even the new young rookies in the tents within the compound react with method and purpose.

"Scud Launch," and the sirens continue to cry in the night. There's a barely discernible whistle in the night air . . . light . . . a roar . . . BOOM! A Patriot missile has left its launcher — and then another, and another, and another. In the haze of smoke a barrage of missiles have leaped into the air to seek and destroy.

I've seen Patriot missile firings for testing under controlled conditions. But this was like nothing I've ever seen. No Fourth of July display has had the

DEAR ADA

power, force or dynamic impact on me as to see missile after missile launch, seek and destroy an enemy incoming missile. To understand that a tactical ballistic missile launched from Iraq has a flight time of approximately seven minutes, traveling at a speed of four to six times the speed of sound, is to realize how very vulnerable any site can be.

Within minutes, the air was still — only the hum of the generators broke the silence. The attack was over. Yet now another task was to be done. Each launcher used had to be reloaded, damage reports taken and assessed, and personnel accounted for.

But for the moment, the threat was over. Within moments, reload operations at three missile sites began. Cranes, forklifts and personnel were on the move to provide assistance in down-loading the now empty canister and uploading the fresh "birds."

At the time, no one could answer for certain what had actually occurred. We knew Iraq had targeted our area for this attack. What we did not know was how heavy the attack had been. Bits of information slowly followed to fill in the holes created in the excitement of a matter of moments.

As the reports and system data were compiled, we learned there were six inbound Scud missiles and all had been intercepted.

There are no heroes in this story as it is not a story, but a war. Each soldier is doing his or her job to accomplish a mission.

It's quiet now, but we know that at any moment the voice can once again call out: "Scud Alert. Scud Launch."

We are safe. No one has been hurt. I want you to know I am safe. I'm having another cup of coffee, reviewing the past few hours and saying a quiet prayer of thanks.

Brian, I love you.

Dad

Double Time Again

Maj. Tom Ruiz offered his reaction to "Double Time," an article in our November-December 1990 issue, and responded to Capt. Mary Fletcher's comments on the article (January-February 1991).

The "Double Time" article told of a different viewpoint using a different writing style. Mr. Collins' attempt to pen a less dirgeful article should be applauded for its approach. At the time of its printing, the news (televised and printed) was filled with sad, solemn stories aimed at soliciting sympathy for those left behind in trying circumstances. Mr. Collins' refreshing illustration of Captain Weiner's story elicits sympathy for Ben and countless others in like situations without the call for pity seen in so many reports in the national media.

Perhaps Captain Fletcher's personal hardships led her to read more into the comment regarding the puppies than the author intended. While I can sympathize with her, many other stories are worth telling. Not every family enduring a separation due to Desert Shield/Storm includes a pregnant spouse missing her husband. Today's Army includes many male dependent spouses who have feelings similar to those of Captains Fletcher and Weiner, but who aren't as comfortable expressing their emotions. Likewise, one does not have to be pregnant, or married, to feel the pain of separation. Countless dependent wives and girlfriends who don't have children are experiencing the anguish created by the absence of their loved ones. The article simply addressed a different kind of family experience resulting from the operation in the Gulf. Certainly, showing sympathy toward those family members and loved ones left behind whose situations are like that of Ben Weiner is equally appropriate.

Regrettably, such is life in the Army. Every day fathers and mothers are unable to share in the wonderful experiences of family life due to military duty and requirements. My first taste of this came in basic training when one of my platoon mates missed the birth of his first child. We all thought it was terrible that the DIs wouldn't let him take a week off to go home. But we learned a difficult but true lesson: the Army is filled with such occurrences. This truism occurs in peace as well as in time of war. The circumstances are not always the same, but the pain of separation is — separation hurts, and the best way to endure it is to help one another, not to compare one's pain to that of another.

May God bless all dependents, family members and loved ones everywhere.

Avenger Air Wolves

Sentinels of the Saudi Skies

Editor's Note. The following article describes activities of an ADA unit prior to the beginning of the Desert Storm ground offensive.

by Robyn Gregory

The Avenger platoons of the 4th Battalion, 5th Air Defense Artillery, are different from your average Operation Desert Storm forward area air defense units, for the unit's Avengers are the only short-range air defense system equipped with organic night vision.

First of the new family of forward area air defense systems to be fielded, the Avenger owes its night vision to Magnavox Electro-Optical Systems' forward looking infrared (FLIR) receiving set. The receiver consists of a passive, serial-scanned compatible infrared imaging system and a display unit that presents a real-time thermal image of the target area to the operator.

The company also delivered prototype thermal imaging night sights for the manportable Stinger to select units in Saudi Arabia. Magnavox hopes to market the manportable night sights to airborne, air assault and light infantry divisions after the Gulf War.

Its night vision capability was one of the primary reasons Desert Shield planners decided to rush the



A 4-5 ADA Avenger unit arriving at a Saudi Arabian port.

recently-fielded Avenger to Saudi Arabia. Two Avenger fire units belonging to the 6th Air Defense Artillery Brigade were allotted precious space on the initial airlifts that ferried 11th Air Defense Artillery Brigade Patriot batteries from Fort Bliss, Texas, to the Persian Gulf.

Another Fort Bliss unit, the 3rd Armored Cavalry Regiment, also took along its Avenger platoon to confront Saddam Hussein. But the 4-5 ADA Avenger platoons operating in Saudi Arabia belong to what

is to become the Army's first fully-equipped Avenger battery.

The 4-5 ADA's Avenger fire units provide cover for the 1st Cavalry Division's tactical, rear and main command posts.

The Renegade "Air Wolves" own the night. Making fresh tracks in uncharted territory, the Avenger units arrive at their positions as the sun disappears. While one person on each team keeps an eye on the sky, another ensures area security against the threat of terrorists.

Rushed to the Persian Gulf following a compressed but intense new equipment training cycle at Fort Hood, Texas, the former Stinger gunners now crewing the Avenger fire units are confident in their ability to accomplish their mission.

"We get a lot of experience on the CFT [captive flight trainer]," said Sgt. Warren Greene, "especially with Apaches, A-10s and F-14s flying around. It's good train-

ing with 10 to 20 aircraft a night around here."

Greene rotates with his partner, Spec. Aaron McGuire, often during the 14-hour shift, the frequency depending on just how chilly the desert night becomes. The duo and the platoon are close. "Your partner becomes like your wife in a sense — you do everything together as a team," Greene said.

McGuire rotated from Germany just in time to join the 1st Cavalry

Division and the 4-5 ADA's Avenger platoons for the Desert Shield deployment.

"The Stinger was a good missile, and they made it even better," McGuire declared. "I feel confident — this is a good opportunity to be a part of something new to air defense."

Robyn Gregory is a 1st Cavalry Division public affairs specialist.

Avenger Reaches Major Milestone



While Operation Desert Storm Avenger units guarded coalition forces in Saudi Arabia, the Avenger program reached a major milestone at home as the hundredth Avenger rolled off Boeing Defense & Space Group's production lines.

"I expect we'll see the same outstanding performance from our Avenger system as we've seen from our Patriot system," said Brig. Gen. Robert Drolet, the Army program executive officer for air defense systems.

"The employee teamwork here in Huntsville and at Boeing Oak Ridge, where the turret shells are manufactured, is the key to our ability to deliver a quality product to the Army," said Ross Dessert, the company's Avenger program manager. "The end result of this teamwork is the presence of Avenger in Saudi Arabia as an essential element of our country's air defense stand against its potential aggressors."

Avenger production, currently at five units per month, will increase to 12 units per month by August. The Army expects to field 1,779 Avenger fire units. Sales to the U.S. Marines and foreign governments may push the number of Avengers produced to 2,000.

CATS

New guidance on training and training resources should reach ADA units this summer

by Maj. Mike Trubia

The Army recognizes the need for a strategy that identifies the training requirements of the total force and develops, acquires and manages the resources necessary to execute this strategy. To meet this goal, the Army has developed the Combined Arms Training Strategy (CATS).

CATS provides guidance on how the total force trains and the resources required for this training. The new training strategy integrates training of heavy, light and special operation forces of both Active and Reserve Components and provides guidance on how the mix of training resources (including ammunition, operational tempo [OPTEMPO], ranges, maneuver areas and training aids, devices, simulators and simulations) will be used to train combat ready forces. It has been developed in coordination with the Army major commands, the National Guard Bureau and the Army Reserve.

To facilitate planning and management, the Army is developing the Standard Army Training System to automate CATS at unit level and provide a practical tool that com-

mands can use to expand the baseline strategies into personalized unit training plans.

Through a number of ongoing and emerging Army training resource master plans, the training resources indicated by CATS are currently available, or will soon be available, to commanders to support training events as the strategies indicate. The baseline strategies are not prescriptive; they are descriptive. The commander applies them as a baseline to his personalized planning and execution of unit training using his judgment of unit training requirements.

The foundation of CATS is a series of branch proponent-generated unit strategies that describe the events, frequencies and resources to train to standard. The descriptive unit strategies recognize that, while there may be a "best" way to train to standard, it is unlikely that all units across the Army will have the exact mix of resources required to execute the strategy precisely as written. By showing the frequency and required resources for training events, CATS will show the relational values of training resources to the training standard. Since the training standard remains constant,

CATS will make it clear that changes in resource availability will have an impact and allow us to make value judgments on resources tradeoffs.

The Air Defense Artillery component of CATS provides a graphic depiction of training programs defined in several previously published training and doctrinal manuals. The CATS document contains ADA weapon systems (gunnery) training strategies found in DA Pamphlet 350-38 and appropriate field manuals (FMs). Training strategies derived from FM 25-100, FM 25-101, Army Regulation 350-41 and the Battalion Level Training Model (BLTM) are also included, as well as the appropriate Army training and evaluation plan, mission training plan and battle drills.

Finally, the CATS document contains a matrix of soldier training requirements for each military occupational specialty (MOS) based on individual training evaluation programs (ITEPs), soldier's manuals and other sources.

The charts that accompany this article are samples of CATS matrices. They reflect training initiatives by the 32nd Army Air Defense Command that emphasize progres-

Individual Training Strategy

MOS 14B, 14S, 18J, 16P, 16R, 16S, 24M, 24N, 27T, 140B

EVENT		(1) PT	APFT	CTT	CTT TEST	WPNS QUAL	NBC	MOS	(2) MAND TRNG	SGT TIME
FREQUENCY										
DAILY	AC							X		
	RC									
WEEKLY	AC	3								X
	RC									
MONTHLY	AC			X			X	X		
	RC								X	X
QUARTERLY	AC				X					
	RC			X			X			
SEMIANNUALLY	AC		X							
	RC									
ANNUALLY	AC					X				
	RC		X		X	X				
BIENNIAL	AC									
	RC									
TADSS										

1. RC performs on an individual basis.
2. AC performs on an as required basis per AR 350-1.

sive and sequential events. Although the strategies are not new or unique, the way they have been depicted requires explanation.

Critical Gates. These are events that have those enabling skills a group of soldiers must conduct to a particular level of proficiency before advancing to the next, more complex event. The events should have a measurable set of standards. Critical gate standards are explained in depth following each CATS matrix.

OPTEMPO. The figures presented are based on the battalion BLTM. The figures for generators are an estimate based on previous experience. Where a training event was in the BLTM (for example, platoon situation training exercise), proportional interpolations were used to maintain the total annual miles and hours. Based on specific

budget targets allocated by individual major commands, installations and divisions, commanders may not receive the full OPTEMPO allocation. The strategies reflect the optimal OPTEMPO in an unconstrained world. Obviously, each unit will have to make OPTEMPO reflect budget considerations. Depending on the commander's assessment, mission essential training list (METL) and resources, he may substitute a simulation exercise for a battalion-level training exercise.

Ammunition. The ammunition allocations and weapon systems strategies depicted are drawn from the STRAC manual distributed in October 1990. As with OPTEMPO, the resource allocations for ammunition are based on a notional strategy and must be considered in terms of FM 25-100 and FM 25-101. It is intended that the commanders con-

sider their assessment and METL and accordingly adjust these notional strategies in the selection of training events and the application of ammunition resources.

Ranges/Maneuver Areas. Distribution and availability of ranges and training land is portrayed on strategy charts and reflect the optimum for a notional unit. FMs 25-7 and 25-8 were used in completing the chart. Alternate resources may be used according to those references if the optimum resource is available.

TADSS. The training aids, devices, simulators and simulations (TADSS) listed under the training events for specific strategies include devices that we anticipate will be fielded between 1991 and 1994. The full range of TADSS capable of training a task should be considered when designing and planning unit training.

Hawk Maneuver Training Strategy (Corps)

EVENTS		DRILL	MAPEX	TEWT	CELL/STF SECTNG	TOCEX	STAFFEX	CPX (6)	FCX	STX	LCX	CFX	DEPEX	FTX/ LFX	EXEVAL CTC	JTX CTX	CSS CUST SPT OPS
LEVELS																	
CREW	AC RC	100 25															
SQD	AC RC																
SECTION	AC RC																
PLT	AC RC																
CO/TRP/ BTRY	AC RC																
BN/SQDN	AC RC		4 2	4 2	WEEKLY 4 4	16 4	16 4	12 2		5 .5			2 .25	3 .25	2 (1) .25	1	
CRITICAL GATES	AC RC	SYSTEM SKILLS						CREW QUAL						AIR DEFENSE EXERCISE	FTX	ARTEP	
RESOURCES																	
2 1/2T				35				60		6			10	70			
OPTEMPO BASE EQ 60KW	AC			140 16				720 96		30			20	210 228			
AMMO										(4)				(4)			
TADSS		(14, 15) (16, 17) (18, 19) (27)	(28) (30)	(28)	(28)	(29, 30)	(29, 30)	(14, 15) (16, 17) (18, 20) (29, 30)		(14, 15) (16, 17) (18, 19) (20, 27)				(14, 15) (16, 17) (18, 19) (20)	(29)	(14, 15) (16, 17) (18, 19) (20)	
TRNG LAND																	

Avenger (Lt Div) Training Strategy

INDIVIDUAL	WPNS QUAL				
CREW		WPNS QUAL	TRACKING PRACTICE	DRILL	LFX
SQD					
PLT					
CO/TRP/BTY					
BN/SQDN					
CRITICAL GATES				TRACKING PRACTICE	DRILL
REQUIREMENT					
ACTIVE UNITS	1	1	100	100	1
RESERVE UNITS					
RESOURCES					
OPTEMPO	25	25			50
AMMO					(4)
TADSS					
TRNG LAND					
TRNG RANGES					

Soldier Training. The success of collective training and the attainment of combat readiness is based on soldiers trained to task standards. The soldier training strategies were based on AR 350-1 and soldier's manuals. Additionally, the critical role played by the command sergeant major working in consonance with the commander to assess soldier training needed to support collective training must be em-

phasized. Therefore, actual frequency of training soldier tasks can be guided by the soldier training strategies, but it must be based on the input of the command sergeant major and NCOs who maintain the status of soldier training.

Finally, these worksheets provide the commander with cross references and planning figures for his unit training. The unit's METL, the commander's assessment of his

unit's training and the higher level commander's training guidance must be determinant factors in planning types and frequencies of training events.

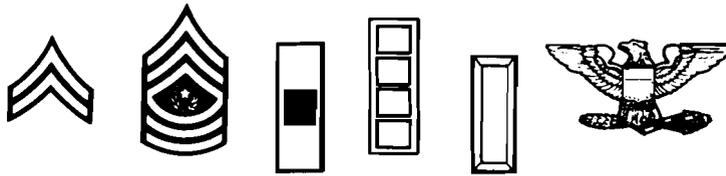
CATS, when fully developed and implemented, will determine what training resources the Army requires and recommend a strategy for effectively training units to standard. Because CATS will shape Army training now and in the future, it is imperative that the field Army participate in the development of CATS and support its implementation.

The U.S. Army Training and Doctrine Command (TRADOC) will field preliminary draft strategies with selected Active and Reserve Component unit commanders for the purpose of acquainting commanders with CATS and offering them the opportunity to provide feedback. Chain of command support is needed to ensure strategies receive a prompt, thorough review.

"Since we're all part of the Army team, it might be worthwhile for soldiers to reflect on two points," says Lt. Col. Thomas R. Rozman, chief of Concepts and Strategies Division, Collective Training Directorate, TRADOC. "First, as CATS users, it is important to apply the system and identify ways to make it better — work it hard and provide constructive feedback.

"Second, if you're in one part of the Army now, you'll be in another part tomorrow. If you're a CATS user in a unit today, you may be a CATS developer in TRADOC or the Materiel Command tomorrow. Awareness of that possibility can help us learn more as we go. Remember, it's our training system to build right!"

Maj. Mike Trubla is chief of Plans Section, Directorate of Training Development, U.S. Army Air Defense Artillery School, Fort Bliss, Texas.



CAREER NEWS

Cadet Perceptions of ADA

Why has ADA become less popular during branch selections at USMA recently? A survey of the cadets and air defense officers at West Point conducted this year, although neither precise nor scientific, revealed misperceptions that undoubtedly contribute to this trend, such as "Air Defense Artillery —

- is not a "real" combat arms branch."
- is not on the front line and is not a decisive branch."
- shows off their weapon systems but not their soldiers."
- is a "soft" branch."
- is not soldier-oriented."
- is a very technical branch."

Not all comments were negative. A small number of cadets thought that ADA was a "true" combat arms branch, not "soft" at all. Other cadets liked the technical aspects of ADA. ADA weapon system displays impress cadets. The obvious question surfacing from the survey pertains to the widely varying perceptions or, in many cases, obvious misperceptions, among cadets. The final segment of the survey asked cadets for their recommendations to improve the ADA image within the U.S. Corps of Cadets. Their recommendations included emphasizing ADA as a "troop" branch that happens to have sophisticated weaponry. Cadets want more exposure to the varied aspects of ADA and the leadership challenges that are presented to a platoon leader. Clearly, all of these recommendations have merit.

The surveyed ADA officers agreed that Camp Buckner (sophomore summer training), TCCAT (Third Class Cadet Armor Training, the only mandatory cadet exposure to ADA during Camp Buckner), and CTLT (Cadet Troop Leadership Training, where a cadet is a third lieutenant for approximately one month in an active unit) were factors in influencing cadet impressions of ADA and their branch selec-

tions. The officers also agreed that cadet training is heavily oriented toward Infantry, with little time for other branch interface.

A number of West Point ADA officers indicated, based on branch accession statistics for other combat arms branches, that ADA has an image problem. The officers believe that the academically successful cadets, such as those that chose USMA for the hard sciences and engineering, choose the Engineer branch to use their academic background. The "warrior" cadets choose Infantry, Armor or Field Artillery, due probably to their desire to be a "warrior" officer.

ADA is, apparently, left in the middle. In fact, a number of ADA officers suggested that cadets choose ADA because they are not cut from the "hard warrior" cloth and do not have the desire (or academic success) to choose Engineers.

We know that ADA is a "real" combat arms branch and that the leadership challenges are second to none. Air Defense Artillery's performance in Desert Storm will, no doubt, encourage many cadets who before were not impressed with the branch. But what can the ADA community do to change these misperceptions?

The officers surveyed recommend that the ADA community first look at how it sells itself. The image of sophisticated weapons is not appealing to the majority of cadets who have grown up in an Infantry-oriented world. These officers made the following recommendations:

- Advertise ADA as a "hard core" branch by increasing the awareness of ADA in light divisions. Show cadets that ADA can be just like Infantry but with a technical flair.
- Promote the diversity of the branch. Cadets like the idea of going from HIMAD to SHORAD.
- Continue to sell the branch's technical aspects, which draw a sector of cadets to ADA.

CAREER NEWS

- Emphasize that ADA officers are just as marketable as other branch officers in the civilian sector; perhaps even more marketable than Infantry officers due to their managing sophisticated systems and leading large numbers of soldiers.

- Encourage the branch representative at West Point to serve as the keystone of the ADA promotional effort, to change the image of ADA among cadets at the grass roots level. He must learn to use the ADA officers at West Point as disciples of the word.

With more emphasis on Infantry-type troop-leading opportunities and continued emphasis on technical aspects by all soldiers involved with USMA cadets, ADA should improve its image as a tough branch whose role on the battlefield has significantly increased with the introduction of modern weapon systems. For the continued success of the branch, we want cadets to choose (or not choose) ADA for the right reasons. Otherwise, both the cadets and the branch provide each other a disservice.

— Maj. Frank Caravella
Department of Geography, USMA

While it is painful to read of these cadet misperceptions, I am grateful to Major Caravella for the work he did in identifying causes and for writing the above article. His recommendations are sound and will be implemented . . . indeed, we have been marketing our branch along some of these lines already. I would submit, nonetheless, two additional factors will contribute to greater popularity of ADA among USMA cadets.

First, we must have a stable of "horses" wearing ADA brass at USMA. If we send our best to staff faculty assignments there, I guarantee they will attract, by their role modeling, top cadets. Many of our "fast burners" avoid like the plague such duty, only to eventually serve some other non-TOE assignment such as a service school, ROTC or recruiting. With good, solid troop time under an officer's belt early, he or she can certainly have abundant time for a USMA assignment and still have another opportunity to be with soldiers before battalion command. Also, I'm not just talking to USMA graduates . . . West Point is trying to achieve a 50-50 balance in staff and faculty between grads and non-grads.

Secondly, the "if you ain't Infantry or Armor, you ain't s---" syndrome plays here. Cadets are influenced by their curriculum and their peers as well as by the staff and faculty. Many of Major Caravella's recommendations will help to counter this influence, as will a top quality ADA contingent. But, in addition, I pledge to work with the USMA leadership to eliminate this perceived institutional bias. Certainly, ADA performance in Desert Storm will help us underscore the absolutely essential role ADA plays as a member of the combined arms team.

— Maj. Gen. Donald M. Lionetti
Chief, Air Defense Artillery

Military Qualification Standards

The Army's system to develop officers as leaders — Military Qualification Standards (MQS) — is based on the philosophy that officers are responsible for their duty performance. The MQS system identifies common and branch training requirements for officers. It has a military task and knowledge component and a professional military education component. The military task and knowledge component provides the critical tasks on which officers must train, while the professional military education component focuses on improving their cognitive skills.

Leader development results from the progressive and sequential education, training and experience an officer receives throughout his career. It starts in the precommissioning phases of training; continues through commissioning, branch education and operational assignments; and stops only when the officer completes his military service. The process depends on three pillars for its success — institutional training, operational assignments and self-development. Each of the pillars must work in concert with the others if the process is to be successful.

School commandants (and other proponents) are most directly involved with the institutional training pillar. The training company grade officers receive in the Officer Basic Course, Officer Advanced Course and the Combined Arms and Services Staff School falls into this category.

Unit commanders are most directly involved with the operational assignments pillar. The MQS system

CAREER NEWS

provides the link between institutional training and operational assignments. It helps the commander construct his unit training plan and design his junior officer development program to complement the training of his unit mission-essential task list (METL).

Individual officers are most directly involved with the self-development pillar. It includes professional reading and self-study. The individual is also the one ultimately responsible for his or her development as a leader.

MQS I encompasses precommissioning training, covers company grade officer training and applies to field grade officers.

MQS II applies to company grade officers in the Active Army, U.S. Army Reserve and Army National Guard. MQS II prepares company grade officers to accomplish their wartime tasks, provides the basis for promotion to major and attendance at Command and General Staff College (CGSC) level schooling, and prepares officers for service in positions of greater responsibility. It provides the bridge for officers to progress through the first and second milestones in their careers (passage points). The requirements that comprise the passage points include completion of appropriate branch schools and developmental assignments, demonstrated proficiency on common and branch tasks, and completion of specified portions of the Foundation Reading program. The first passage point occurs when officers enter their branch Advanced Officer Course. The second occurs when officers complete their company grade careers and either enter resident CGSC or enroll in non-resident CGSC.

The military task and knowledge component for MQS II is organized into common task areas, which are essential for all company grade officers; and branch-specific task areas, which apply only to the officers in a particular branch. The professional military education component of MQS II consists of a reading program and, for selected officers, advanced civil schooling. MQS provides commanders with the flexibility they need to establish leader development programs for their officers that complement their METL-based unit training programs. The focus of unit leader development programs must be warfighting and the METL. Therefore, commanders must tailor both their MQS task training program and their profession-

al reading program to support their METL-based unit training plans. MQS does not require commanders to train tasks that do not support their unit METLs.

The MQS II implementation plan involves distribution of both a common manual and branch manual. The common manual was distributed in December 1990, and the branch manuals were distributed from January to March 1991.

The U.S. Army Publications Distribution Center shipped the new manuals based on specific unit requirements identified on DA Form 12-99. Follow-on distribution (to newly commissioned officers) will be through the Officer Basic Course.

Each lieutenant and captain should have a personal copy of the MQS II common and branch manuals. If not, check with your unit now to verify that your copies of the MQS II manuals are on order.

Officer Schools

DA recently released a message outlining the current policy on attendance at officer professional development schools.

Ninety-seven principal selectees for Senior Service College (SSC) are deployed to Southwest Asia. The current plan is to have these selectees attend SSC this year. PERSCOM must receive any requests for operational deferment no later than May 1, 1991. Deferred principal selectees will not have to re-compete for selection; the next board will revalidate them.

More than 130 of the Command and General Staff College selectees are deployed to Southwest Asia. The current plan is to *approve* requests for deferral submitted to PERSCOM no later than May 1, 1991. The next board will revalidate deferred selectees.

Approximately 35 percent of all Officer Advanced Course eligible officers are deployed. These courses will continue as scheduled (though some rescheduling is anticipated), and eligible officers will attend when they are redeployed.

Command designees in theater who are scheduled for the Pre-Command Course (PCC) are being deferred and rescheduled on a by-case basis. Because of the high visibility of PCC, both PERSCOM and the Office of the Deputy Chief of Staff for Operations are tracking these deferrals.

NLOS Contest on Hold

The contest to name the non-line-of-sight (NLOS) component of the forward area air defense (FAAD) system has ended not with a bang but a whimper. The NLOS Program Management Office, Redstone Arsenal, Ala., received 53 submissions prior to the contest deadline, but funding for the NLOS system has been canceled.

The decision to terminate NLOS funding was based on several factors. The Army faces a full-scale development cost of nearly \$400 million vs. the initial contractor bid of \$131 million. The Army maintains the difference represents the cost of converting the Boeing system, which apparently met original contract requirements, into the type of system the Army now feels can be successfully integrated into the FAAD system of systems.

Critics charge the Army torpedoed the NLOS program by adding too many "bells and whistles" to an innovative and relatively inexpensive system perfectly capable of performing on the battlefield.

However, news of NLOS' death may turn out to be greatly exaggerated. Army leaders were scheduled to meet in March to discuss fielding a "no bells and whistles" version of the NLOS system said they are confident funding will be restored.

Meanwhile, plans call for an orderly cessation after the first NLOS flight tests are conducted this summer. The Army will capture the technologies developed for use in future systems.

"The forward area air defense requirements for a non-line-of-sight component still exist," said a U.S. Army Training and Doctrine Com-



Army officials hope funding for the FAAD NLOS component will be restored.

mand system management officer. "We're confident that those requirements will be met, if not by the system expected, by a system that will perform much the same functions using similar technology. This means the list of names submitted to the NLOS contest should remain appropriate."

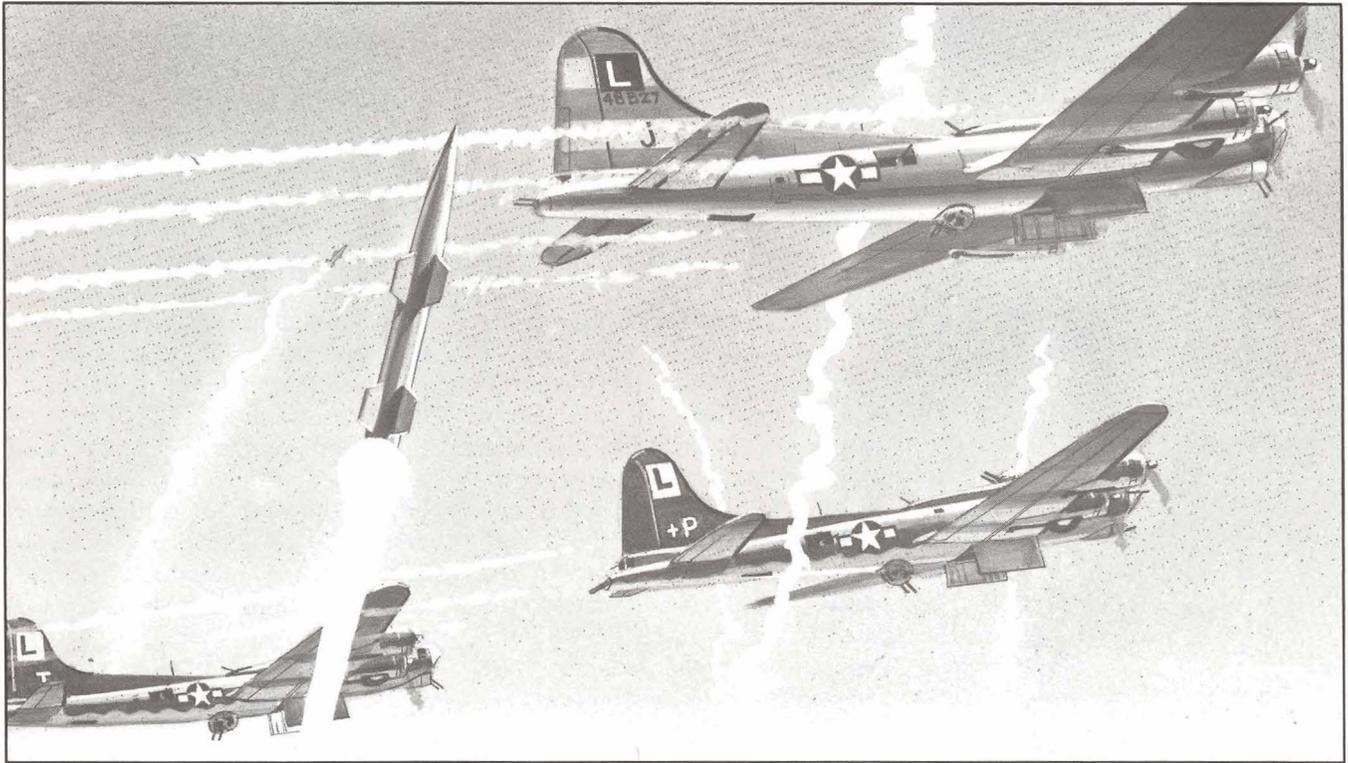
He said that names submitted under contest guidelines will be preserved along with NLOS technology and used to name the non-line-of-sight system when, and if, the system is fielded.

The "Name that NLOS" Contest was announced in the September-October issue of *ADA* magazine. The deadline for entries expired Jan. 1. The person submitting the winning entry will receive a \$100 savings bond, a plaque bearing a photograph of the system and an official letter of recognition.

The names at right were submitted prior to the entry deadline.

The deadline has been extended for submissions from the Persian Gulf, and the list does not include names submitted by Desert Storm soldiers.

Phoenix	Sky Eye
Skylander	Seeker
Smart Arrow	Smile Sucker
Guardian	Ferret
Viper	Comet
Duck Hunter	Equalizer
Gremlin	Private York
Terminator	Fibersniper
Cheap Shot	Pilgrim
Saber	Griffin
OMNI	Ghostbuster
Conqueror	Enforcer
Wizard	Marauder
Eagle Eye	Tsunami
Peregrine	Gauntlet
Hunter	Raider
Sander	Stryker
The Shadow	Cyclops
Snoopy	Stingray
Predator	Javelin
Manticore	Prism
Eye of the Tiger	Theseus
Tiger's Eye	



Gulf War Weaponry Spawned in WWII

by Wolf Prow

Even casual students of military history are aware that the V-1 “buzz bombs” and V-2 rockets that Germany launched against London are the forerunners of the Scud missiles intercepted during Operation Desert Storm by Patriot missile batteries in Saudi Arabia and Israel. Fewer are aware, as we commemorate the 50th anniversary of U.S. involvement in World War II, that jet aircraft and surface-to-air missiles (SAMs) also made their debut in the war-torn skies of that worldwide conflagration.

Present-day air defense arsenals rely on rockets and missiles rather than guns as their mainstay. The evolution of reaction vehicles and guided missiles parallels the history of aviation. The appearance of aircraft as a viable weapon in World War I called for devising effective defenses operated by the soldier on the ground. At first, machine guns and field artillery pieces were directed skyward. Results were disappointing and weapons with high muzzle velocities, elevation to near right angles and 360 degrees traverse were recommended. The U.S. Army was profoundly influenced by recommendations of

the Westervelt Board, which led to development of special anti-aircraft weapons with “higher initial velocities.”

Other countries pursued similar goals and developed various anti-aircraft guns. The German 88mm AA gun was probably one of the best known and most successful of these weapons. However, aircraft performance continued to outrun ground-based defenses. Demands for targeting and fire direction, together with new standards of accuracy and computing capability, created staggering problems.

Smaller calibers with high rates of fire proved adequate for tactical

German SAMs

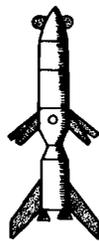
Wasserfall



Enzian 5



Rheintochter III



Schmetterling



Taifun



uses and in defense of higher value targets, but became less and less effective against fast aircraft and when challenged by flak suppression missions. Barrage balloons offered defenses against low flying aircraft, but were limited to the area so protected. Expensive, heavy anti-aircraft guns requiring sophisticated fire direction devices did little to slow the relentless attacks of vast allied air formations or the flights of German planes bombing targets in Western Europe or the Soviet Union. Clearly, new anti-aircraft weapons with higher velocities, more lethal warheads and greater accuracy were desperately needed.

Germany conducted secret research beginning in the 1920s to find a weapon that exceeded the capabilities of even the heaviest contem-

porary artillery. This was to be achieved without violating the Versailles Treaty that limited Germany to cannon artillery of 155mm or less. The Germans opted for the Aggregate 4 design, a liquid fuel rocket that could deliver one ton of high explosives to a range of 350 kilometers. This design became operational as the V-2 in September 1944 and provided the technical foundation for numerous other rockets. The German army led the world in design and development of advanced weaponry, but frittered away the advantage when early military successes in World War II led to cutbacks in costly research programs. When the fortunes of war turned, rocket research was belatedly accorded higher priority. Development of rocket-assisted projectiles and the pressing need to upgrade anti-aircraft artillery resulted in the fielding of unguided Taifun or Loki rockets.

Conventional cannons fired Taifun rockets at velocities of 1,050 meters per second, a spectacular achievement considering modern guns just now approach such muzzle velocities. Key to the employment of unguided rockets with small (one pound) warheads was mass fire. The Taifun was effective, but insufficient quantities precluded scoring significant successes.

The Taifun or Loki option led to fin-stabilized missiles and other innovations in high velocity tank guns, antitank guns and field artillery. Rockets also proved suitable as power plants for guided missiles and as boosters carrying air-breathing vehicles aloft. Experiments with this form of propulsion had been ongoing in several countries for years.

Under the onslaught of allied bomb raids on German cities, pressure mounted to retaliate and to field more effective anti-aircraft weapons. In competition with the army's V-2, the German air force designed an inexpensively built fly-

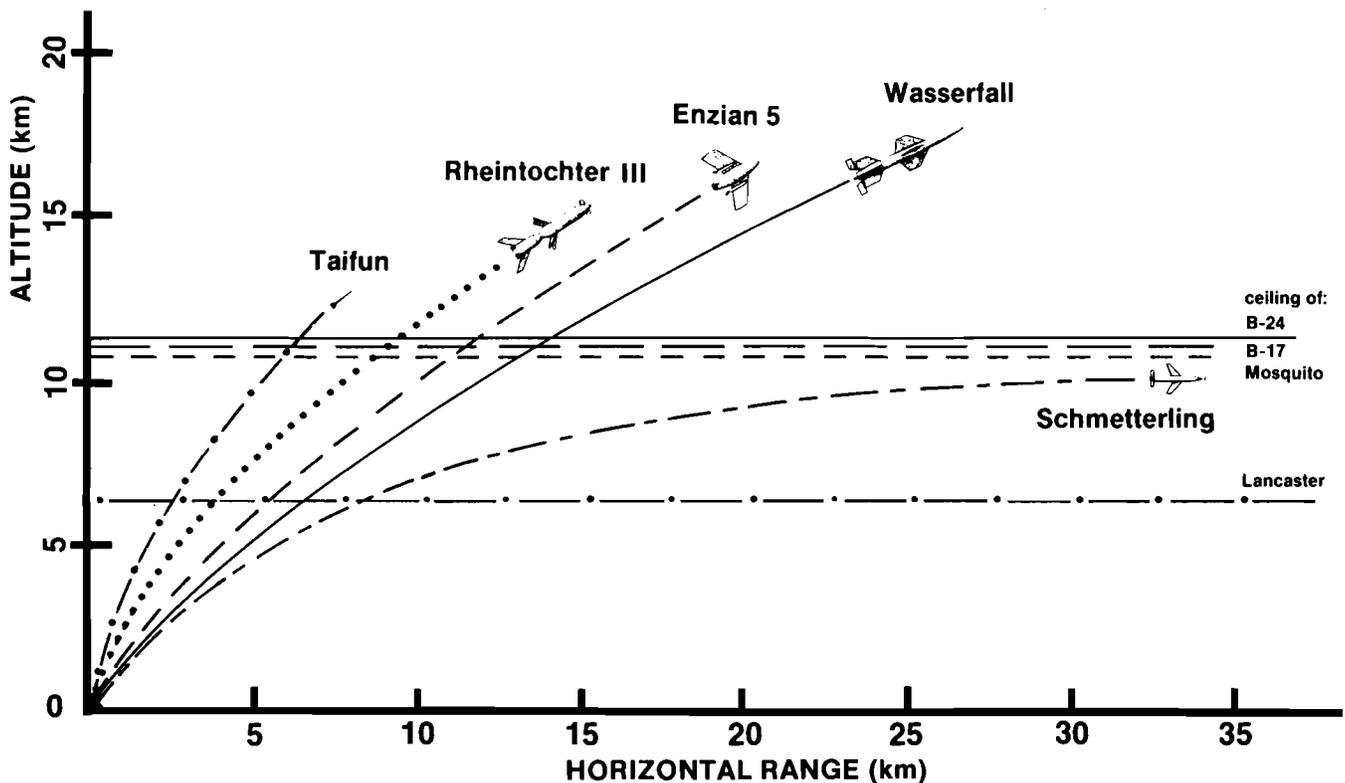
ing bomb and launched it against England as the V-1 in June 1944.

Jet aircraft became operational and would have been very effective interceptors, but the German high command directed that the jet fighters be converted to bombers. This weapon suffered from fuel shortages, absence of seasoned pilots and usable runways as Allied air supremacy hammered away at the remnants of the Luftwaffe and at the dwindling number of air facilities.

Ground-launched anti-aircraft projectiles with a destructive warhead, high speed and high ceiling that could be guided to the target remained the option for air defenses. Existing aerodynamic vehicles appeared to be among the most suitable candidates as weapons against high-flying aircraft.

Rockets could boost such flying craft into the air, or provide for bursts of speed. Fixed-wing, pilotless aircraft small enough to be carried by bombers were suitable as air-to-surface weapons or as cruise missiles. Guidance and control presented problems. The aerodynamically designed Henschel (HS 117H), code named Schmetterling (Butterfly), promised a manageable solution with a respectable horizontal range of 35km. Although obsolete since it could not match the speed or ceiling of World War II bombers, it was an experimental platform for remotely piloted vehicles and taught valuable lessons about guidance, ground equipment and rocket boosters.

Among a related series of air-breathing, aerodynamic, surface-to-air missiles was the Enzian. The concept was to guide a very large warhead into enemy air formations to achieve maximum destruction. The Enzian 5 could lift a heavy (300kg) warhead to required altitude and to a 15km horizontal range at the necessary speed. This design remained experimental, but be-



came the forerunner of such aerodynamic versions as the US BO-MARC and the Soviet Gammon.

Ballistic SAMs were the most promising designs. The Rheintochter (Daughter of the Rhine) series sought to exploit this advantage with a relatively large warhead, but was shelved when the Germans selected only the models closest to fielding for concentrated development efforts.

The most spectacular German SAM had the code name Wasserfall (Waterfall). It was a scaled-down version of the German army's V-2 and would have seriously crippled, if not halted, the bomb war had it been operational earlier. The Wasserfall traveled at more than twice the speed of sound to an altitude of 17,000m and a horizontal range of 126km.

The Wasserfall had a diameter exactly 10 times greater than 88mm AA guns and a 90kg warhead. This was the antiaircraft weapon design of the future and the granddaddy of Nikes, Bloodhounds, Gainfuls, Ganefs and others.

The Germans completed the design phase in April 1943 and the first guided flight in February 1944, but time ran out before the Wasserfall could be fielded. The concept stimulated widespread adoption.

Victorious nations experimented with the captured Wasserfall. The U.S. Army extensively tested the Wasserfall and based U.S. designs on it. The Soviet Union conducted similar tests, with the Silnishnikov-developed Nii-88 becoming the very basis for Soviet SAMs successfully employed against U.S. aircraft in Korea and over Vietnam. SAMs proved a bane for the Israeli Air Force as well and called for new tactics — specially planned and orchestrated missions to saturate the detection and fire direction centers and then to neutralize the launching sites. The Soviet SA-4b Ganef of 1964, and other SAMs around the world, provide examples of direct descendents of the Wasserfall.

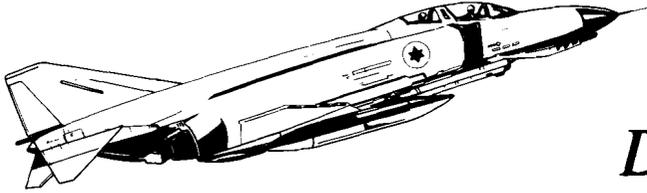
Numerous types and subtypes of air defense weapons have been developed since World War II. Noteworthy advances were made in

guidance and control as well as miniaturization and computerization. Shoulder-fired weapons such as Stinger, Blowpipe and Grail have caused changes in the employment of fixed-wing aircraft and helicopters. Moreover, the SAM challenges the heretofore dominant role of aircraft in any conflict. Now the infantry soldier, as well as the insurgent or terrorist, have unprecedented firepower to combat aircraft. German World War II designs, prototypes of today's missiles, ushered in a new era in air defense.

The future promises technology that will again revolutionize defenses against all types of aircraft and missiles. These technical advances will include high energy lasers, radio frequency weapons and particle beam emitters. New fields of magnetohydrodynamics and electromagnetic devices will also impact warfare of the future. On the ground, air defenders may yet gain the advantage.

Wolf Prow is the Threat Manager, U.S. Army Aviation Logistics School, Fort Eustis, Va.

The Yom Kippur War



*Desert war set the stage for
Operation Desert Storm*

by Maj. Frank J. Caravella

Space aboard contingency operation airlifts is a precious commodity, especially during a contingency operation as urgent as the Operation Desert Shield deployment of U.S. forces to Saudi Arabia. The expediency with which ADA fire units were allotted scarce space aboard some of the very first airlifts testifies that U.S. commanders understand and appreciate Air Defense Artillery's vital contribution to combined arms contingency operations.

This appreciation of air defense is a relatively new phenomenon, the origin of which can be largely traced to an earlier confrontation that took place in the same sun-bleached corner of the world as Operation Desert Storm.

The Yom Kippur War of 1973 pitted two Arab armies — Egyptian and Syrian — bolstered by a massed antiaircraft arsenal, against Israel's vaunted air force and armor units. When the short but violent conflict was over, the ability of surface-to-air missiles (SAMs) and antiaircraft gun batteries to play a dominant role on the modern battlefield could never again be held in doubt.

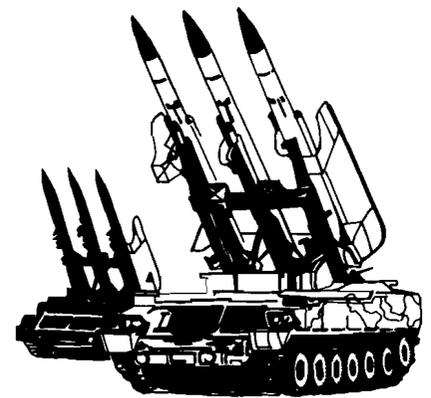
Prior to the Yom Kippur War, the Egyptians were profoundly influenced by their experience in the Six Days War of 1967, when an Israeli pre-emptive strike destroyed much of their air force on the ground. The Egyptians also worried about the technological advantages of Israeli aircraft and the superior training of Israeli pilots. They understood that to start a war with Israel without first addressing the Israeli air superiority would invite disaster.

At the urging of the Soviet Union, their main weapon supplier, the Egyptians initiated a massive effort to upgrade their air defense force. The Egyptians expected their new, technologically advanced aircraft and air defense systems to help them offset the Israeli advantage in the air, and they planned their operations in such a way that Israeli air power, which had been the decisive factor in the Six Days War, would not make significant contributions in the next war.

At the initiation of hostilities, Egypt possessed about 770 combat aircraft, among them the latest the

Soviets could provide. These included 220 MiG-21 and 200 MiG-17 fighter-bombers, the latter also effective in ground support roles. The Egyptians also possessed 120 Su-7 close combat support aircraft, 18 Tu-16 bombers, 10 IL-28 bombers, 40 to 50 transport aircraft and 100 to 140 helicopters. These aircraft were distributed over 35 Egyptian military airfields that had been specially prepared for wartime operations. However, about 150 of the aircraft were in storage because the Egyptians had not been able to train enough pilots to fly them.

The Egyptians placed most of their confidence in their new air de-



Air Defense Artillery

fense batteries. They organized their SAM and anti-aircraft gun units into an air defense organization separate from the air force. This command deployed both older and newer air defense systems that had been developed by the Soviets.

The Egyptian air defense arsenal included 40 SA-2 and 85 SA-3 high-altitude SAM batteries. New SA-6 batteries, numerous man-portable SA-7 air defense missile launchers and a strong mix of anti-aircraft guns protected Egyptian forces from low-altitude air attack. The Egyptians fielded about 1,300 anti-aircraft guns, including 23mm ZSU-23s, 23mm SU-23s and 57mm anti-aircraft artillery guns.

A unique feature of the Egyptian air defense force was its possession of six to nine squadrons of MiG-21s dedicated to the air defense role. The willingness of the Egyptian high command to place them under the air defense commander signified the importance they attached to the role air defense was to play in the coming battle.

Syria, which was to force Israel to fight a two-front war by coordinating its offensive with that of the Egyptians, had also upgraded its air defenses. The Syrian air force had 200 MiG-21s, 80 MiG-17s, 80 Su-7s and 36 helicopters dispersed among eight airfields prepared for conflict with additional hangerettes, runways and repair crews. Syria organized its air defense force along the same lines as the Egyptians. A separate command controlled about 16 SA-2 and SA-3 batteries. The Syrians deployed about 900 anti-aircraft pieces that included a mixture of ZSU-23s, Su-23 and 57mm guns supplemented by SA-7 man-portable missile launchers. Unlike his Egyptian counterpart, the Syrian commander did not control dedicated aircraft for air defense purposes.

The Arab antagonist, Israel, deployed between 420 and 500 air-



Coordinated Egyptian and Syrian offensives forced Israel into a two-front war.

craft. These included 130 F-4 fighter-bombers, 160 A-4 attack aircraft, 60 Mirage III interceptors, 50 B-2 fighter-bombers and 10 Vantour light bombers. These aircraft could be found on 20 airfields throughout Israel and the Sinai.

The Israeli air force controlled the country's SAM units. Since the Israelis were confident their pilots could defeat the Arab air forces aligned against them, despite their superior numbers, they had made little effort to upgrade their ground air defense capabilities. The Israelis possessed about 10 Hawk batteries, five to six of which were deployed along the Suez Canal. To protect the SAM batteries and ground units against low-altitude air attack, the Israelis fielded a mixture of 20, 30 and 40mm anti-aircraft guns.

The Egyptians, intending to strike first, expected a quick and violent reaction from the Israeli air force. They planned to meet the onslaught with an air defense barrier consisting of sophisticated SAMs and anti-aircraft weapons. The Israelis, true to form, reacted to Egypt's storming of its Suez Canal strongpoints by launching air attacks against the Egyptian bridgeheads. The Arab air defense batteries were prepared and waiting. The subsequent air battle proved nearly disastrous for the Israelis. United Nations observers estimated that 60 percent of the Israeli aircraft transgressing the Egyptian air defense barrier thrown up along the Suez Canal were hit by missile or anti-aircraft gun fire.

Israeli aircraft losses on the second day of the war were so great

that the Israeli air force commander ordered his pilots not to fly within 15 kilometers of the canal, a tactic that denied beleaguered Israeli infantry and armor units air support over the main portion of the battlefield. When the Israeli air force resumed operations against the expanding bridgehead, they were met not only by the barrage of air defense fire, but with MiG-21s as well. Again, losses were heavy, and Israeli pilots were forced to adopt evasive tactics that limited their effectiveness. Israeli targeting priorities switched from infantry and armor units to air defense sites.

A turning point came when the Egyptians, hoping to capitalize on their early gains, moved SAM units across the canal. These SAM units became vulnerable to ground attack, and their destruction left a gap in the Egyptian air defense barrier.

The Egyptians were forced to withdraw their surviving SAM batteries back across the canal. Egyptian pilots, as expected, proved no match for better-equipped, better-trained Israeli pilots, and, with the Egyptian air defense batteries withdrawn, Israel quickly established air superiority. Attacking Egyptian armor and infantry were exposed to devastating Israeli aerial attacks that forced them to assume a defensive posture.

Once its armor units were massed in the Sinai, the Israelis launched successful counterattacks. They sent an armored brigade across the canal in an encircling maneuver aimed specifically at destroying the Egyptian SAM sites, or as the Israeli ground commander put it, "to punch a hole in the sky."

Syria deployed its SAM forces more to protect strategic sites in-

side Syria. On the Golan Plateau, the Israelis were able to neutralize many Syrian SAMs by hitting their parabolic radar antennas with artillery and mortar fire, creating and widening corridors in which their aircraft could operate in relative safety.

A strategic Israeli air attack against targets inside Syria destroyed the Syrian's computerized air defense command and control center, a loss that degraded the effectiveness of Syrian SAM batteries and made them more vulnerable to Israeli air strikes for the rest of the war. The Syrian air force was never committed to full-scale battle. As a result, it suffered few losses, but made only minor contributions to the battle.

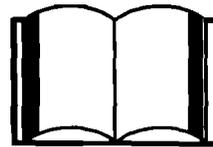
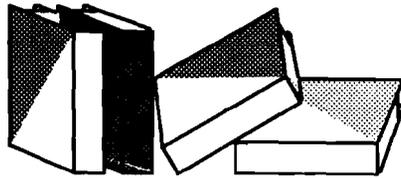
Israel claims its Hawk batteries destroyed 22 aircraft. However, their fire, restricted to protect friendly aircraft, was limited by lack of opportunity and inability to acquire aircraft at low altitudes. Engagement opportunities were rare for Israeli anti-aircraft guns.

The Yom Kippur War dramatically demonstrated the effectiveness of air defense. There are conflicting claims as to the magnitude of aerial losses during the war, but DoD estimates the Arabs lost 368 aircraft while the Israelis lost about 200, three out of five to ground air defense fire. Everyone agrees that this constitutes the loss of a lot of aircraft in a relatively short time.

The vulnerability of unprotected armor and infantry units to air attack, once the air defense umbrella has collapsed, was just as dramatically demonstrated. On both the Suez and Golan fronts, Israeli aircraft pounced on any Egyptian or Syrian spearhead that crept out from beneath its air defense umbrella and left it in smoking ruin.

Maj. Frank J. Caravella is a West Point professor of geography.





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Armed Forces on a Northern Frontier: The Military in Alaska's History, 1867 - 1987 by Jonathan M. Nielson. 298 pages. Greenwood Press, New York, 1988. \$39.95.

For many Americans of the "lower 48," Alaska is an intriguing combination of familiar stereotype and unknown reality. A contribution such as *Armed Forces on a Northern Frontier*, which focuses on a locale often thought of only in terms of dogsled races and oil spills, is a timely and welcome event.

The book appears to be the product of a massive quantity of labor as well as a labor of love — the author's enthusiasm for Alaska is evident throughout.

Nielson's work is packed with detail and a long list of references. The book's size and modest number of pages (298) is deceptive in that it is printed in a tiny (600 words per page) typeface. The typeface is hardly bigger than that used in a telephone book.

There is a lot here. For that reason, it is bound to be a valuable tool for anyone researching the subject of Alaska.

Unfortunately, the book is flawed in that it does not achieve the author's stated purpose of providing "a useable understanding of Alaska's past as a process of interrelated or connected events, people and ideas."

The book lacks focus. It appears that portions of it were developed and presented as separate papers. The rationale for the chapter structure is not evident; while chronological ordering is suggested by the title, the chapters are not strictly faithful to this. The chapters of any book should form an integrated whole. Otherwise, the resulting product is a compendium, not a book.

There is enough raw material in Nielson's effort to develop several very good works on Alaska, but the author failed to discipline himself to providing information only supporting his main point. If all this data

had been sifted and interpreted, a valuable contribution might have been made toward a better understanding of our northernmost state.

I found this book to be much like a cluttered attic: likely to have valuable and interesting objects, but hard to decipher as a pattern.

— Patrick G. Sullivan Jr.

Inside Spetsnaz - Soviet Special Operations: A Critical Analysis edited by Maj. William H. Burgess, III. 308 pages. Presidio Press, Novato, CA, 1990. \$24.95.

Inside Spetsnaz is an informative book that may have slightly missed its best release time due to the thaw in East-West relations. Although the current political atmosphere has changed in Europe, the capabilities of the Soviet military have not. Nor has the fact that the Soviets, or their surrogates, are likely to apply these forces should they see a need to use them. Consequently, the book retains its value for students of military operations regardless of its timing.

In *Inside Spetsnaz*, Burgess assembles the works of ten authors, all experts in some aspect of special operations, to cast light on *Spetsnaz* operations, formations and capabilities. *Inside Spetsnaz* presents in chronological format the development of special operations from the Russian Revolution through Afghanistan, followed by a review of current organization, training and missions and a summary of major observations and conclusions made throughout the book.

Typical *Spetsnaz* capabilities are identified through historical examples of operations that contain a significant amount of detail. Although this gives the reader a better feel for the capabilities and limitations of *Spetsnaz*, it also forces the reader to carry a lot of detail along to maintain the thread in each historical segment. One interesting aspect of the historical perspec-

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tive, however, is the appearance of certain individuals in the most successful operations.

The editor and his authors accomplish several important goals in the course of this work. They distill the information of a vast number of references, including Russian language publications, into a single open-source volume. As a result, they open up the formations and accomplishments of *Spetsnaz* in a historical sense and suggest to the reader some current capabilities and, perhaps as important, limitations.

Since the information presented in *Inside Spetsnaz* is quite detailed and specialized, it is probably not fare for the casual reader. However, for those interested in the study of the Soviet use of special operations in the strategic and operational level of war, this is just the book to provide valuable background.

Eminent Victorian Soldiers; Seekers of Glory by Byron Farwell. 367 pages. W. W. Norton & Co., New York, London, 1988. \$7.95.

During the latter half of the 19th Century, Great Britain was at the height of its empire building. Conflicts with other nations were frequent and her soldiers found ample opportunity to achieve fame through exploits on the battlefield.

This search for glory in far-off countries is the theme of Farwell's book, as the subtitle indicates. A military historian, Farwell provides brief biographical sketches of Britain's best known Victorian era generals: Hugh Gough, Charles Napier, Charles "Chinese" Gordon, Frederick Roberts, Garnet Wolseley, Evelyn Wood, Hector Macdonald and Herbert Kitchener.

These eight men spanned Great Britain's zenith as a world power and defended the crown's interests on distant battlefields from China to South Africa. As we read about the careers of these officers, we learn not only about their perseverance in the face of adversity and physical courage in combat, but also about the prevailing British attitude toward war, which remained largely unchanged until the trench warfare of 1915 began to take a grim toll on British youth. Along the way, we also learn some interesting information about the qualities of leadership these men displayed.

Representative of the individuals depicted is Sir Garnet Wolseley — highly decorated, knighted and promoted to field marshal. In his first battlefield action, Wolseley led a successful charge against a hostile force and took a bullet in the leg. Although wounded, he continued to lead his soldiers in combat. His efforts brought him battlefield promotion. Not long afterward, Wolseley was severely wounded in the Crimea, losing an eye and sustaining other serious facial and leg wounds. But he remained on active service.

Promoted to major before age 25, Wolseley rose to major general by 35. Typical of Farwell's eminent Victorian soldiers, he volunteered to go wherever there was promise of action, excitement and recognition.

Farwell's work, intended as a companion piece to a much earlier work entitled *Eminent Victorians*, is informative and entertaining, providing readers with a glimpse of military life in a bygone era. A glossary and a list of abbreviations included at the back are helpful to those not familiar with British military terms in use at the time.

Although the chronology is sometimes hard to follow and the book is marred by occasional typographical errors, *Eminent Victorian Soldiers* is worthwhile reading for broadening one's background in British military history.

— Col. Marcella V. Powers, USAF

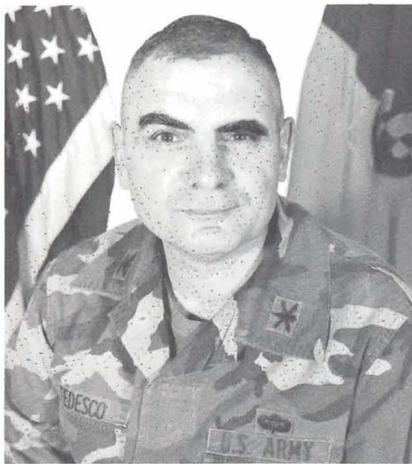
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Book review specifications are as follows:

- Submit typewritten or neatly handwritten reviews (do not exceed 500 words).
- Use style and format similar to that found in the *New York Times*.
- Limit reviews to factual, historical, geo-political or military books and novels of unusual military interest.

ADA has no formal deadlines, and publishes reviews based on editorial requirements.

Submit reviews to Book Review Editor; ADA Magazine; ATTN: ATSA-ADA, Bldg. 55; Fort Bliss, TX 79916-7004.



ADA Association News

What a great time to be an Air Defender! Your association joins all of you in our pride for how well all our soldiers performed in the Gulf War. We have supported, and will continue to do our best to support, our soldiers, their families and the units that have shown the world that we have the best Army and the best ADA in history.

Air Defense Artillery played a decisive role in every phase of Operation Desert Storm, from the initial lodgement through the climactic ground battle. Patriot and the soldiers who crew it became the Gulf War's first heroes by knocking down Scuds over Saudi Arabia and Israel. "When the history of Desert Storm is written," said Gen. H. Norman Schwarzkopf, "the Patriot will be singled out as the key. Patriot's success has ensured coalition solidarity."

To commemorate Patriot's magnificent feat of arms, your ADA Association has designed and printed thousands of "Scudbuster" T-shirts. We sent over \$4,000 in free T-shirts to our great Patriot soldiers in Saudi Arabia, Israel and Turkey. A photo of 11th ADA Brigade Scudbusters holding aloft their T-shirts over the carcass of an Iraqi Scud appears on page 3 of this issue of ADA. The T-shirts have since become bestsellers in the ADA Association Gift Shop.

Patriot's performance in the Gulf War has enhanced the image of all air defenders. We should all encourage and work to promote the growth of PATRIOT PRIDE.

This month we are working on programs to effectively manage the association and better support our air defenders in the years to come.

We are proud to welcome the Bataan Chapter of the 111th Air Defense Artillery Brigade of the New Mexico Army National Guard as a new branch chapter and Colsa, Inc. (Huntsville); Science Applications International Corporation (Huntsville); Superior Copy Machines; RECON/OPTICAL, Inc.; McDonnell Douglas Corporation; CAS, Inc. (Huntsville); Hughes Aircraft Company (Huntsville); SRS Technologies; Coleman Research Corporation; General Electric; Mutual Life Insurance Company of New York; Magnavox Electro-Optical Systems; and Kollsman as new corporate members. The new Huntsville memberships belong to corporations that had previously joined the national association. We keep growing in strength and pride.

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1991 ADA Commanders Conference

The 1991 Air Defense Artillery Worldwide Commanders Conference is scheduled for June 3-7 at the U.S. Army Air Defense Artillery School, Fort Bliss, Texas. The conference attracts approximately 500 field grade and general officers to Fort Bliss.

This year's theme is ADA in the '90s, "The Challenge Met . . . The Challenge Ahead." The conference will feature briefings on ADA operations during Operation Desert Shield/Storm.

In an effort to increase the number of displays that proved so popular at last year's conference, the ADA School and the Air Defense Artillery Association continue to welcome defense-related contractors who wish to display their products and services.

Displays, subject to the approval of the commandant, may include air defense weapons and related technology and personal services available to ADA soldiers. Displays will be set up in the hallways and meeting rooms of the Fort Bliss Headquarters Building, where most of the conference activities will take place. No direct solicitation may take place.

Contractors interested in attending this year's conference or reserving display space should contact the ADA Commanders Conference action officer, Maj. Thomas Lemon, at (915) 568-4811.

Contractors who wish to place advertisements in the *Air Defense Artillery Yearbook*, a showplace publication published in conjunction with the conference, should contact Terry Lewis or Glynn Leach, Image Southwest, (903) 793-5528.



"Happy" Foote tallies receipts from another big day of "Scudbuster" T-shirt sales.

'Scudbuster' T-shirts Top Sales

Private corporations and individuals are capitalizing on the sale of Operation Desert Storm memorabilia ranging from trading cards and board games to scale model weapons systems and bumper stickers, but only Air Defense Artillery soldiers capitalize on the sale of official ADA Association "Scudbuster" T-shirts and other Desert Storm commemorative items.

"The Scudbuster T-Shirts are the 'Cabbage Patch dolls' of T-shirts," said the association's "Happy Foote. "We've had to reorder as many as three times a day."

The colorful T-shirts retail for \$9.95 and come in sizes small, medium, large, extra large and extra-extra large (adult) and extra small, small and medium (children). Sweaters of the same design will soon be available.

Also on sale at the ADA Association Gift Shop are Desert Storm pewter paperweights by Charles Hill (\$65), gold- and silver-plated coins (\$19.95), and gold- and silver-plated (\$49) or nickle-plated (\$19.95) belt buckles. "God Bless Patriot by George" bumper stickers are priced at 50 cents.

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